

OS/2

M A G A Z I N E

Reviewed

SpaceMap

SkyScraper

The Graham Utilities



ROLL-YOUR-OWN CD-ROM

How To Go From Hard Disk To Compact Disc

OS/2 vs. Advanced Graphics

Making OS/2 work with
SVGA boards

NEW COLUMN!

Will Zachmann's

"The View From Canopus"

\$3.95 US/\$4.95 Canada

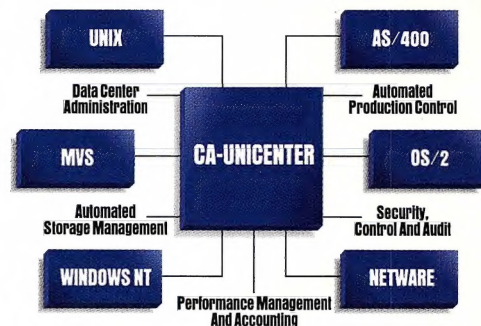


A Miller Freeman Publication

Presenting The 7 Of Systems Mana

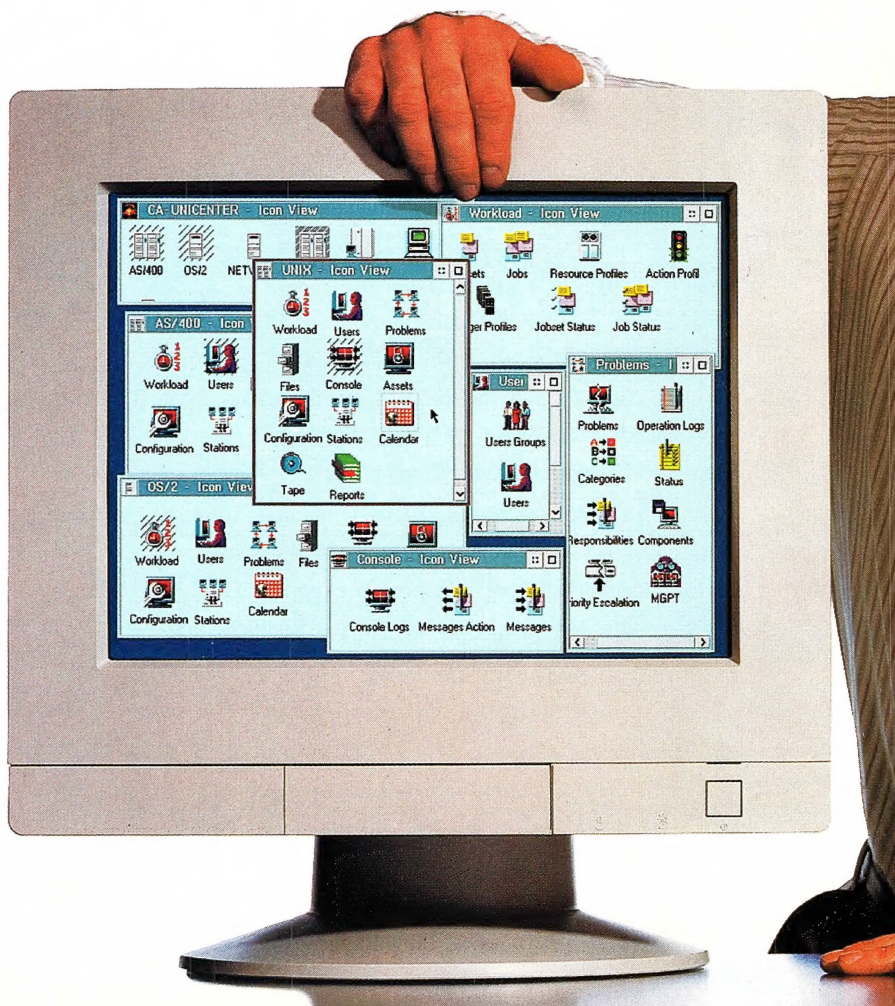


1 Replace Disparate
Point Products With A
Single, Integrated,
Comprehensive Solution.



2 Choose A Client/Server
Application That's
Interoperable, Scalable
and Portable.

3 Demand An Open
Solution That Supports
All Key Industry Standards
And Protocols.

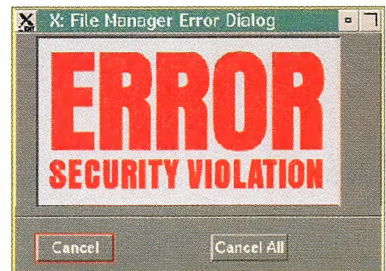


**COMPUTER
ASSOCIATES**
Software superior by design.

Commandments gement Software.



4 Standardize On A Common GUI Interface That Makes It Easier To Use. Reduce Training Costs And Boost Productivity.



7 Protect All Your Data With Bulletproof Security Software That Supports Every Platform And Operating System Across Your Entire Enterprise.

5 Partner With The World's Leading Software Company.



6 Leverage Your Systems Management Experience, Expertise And Personnel.



When choosing your systems management software, you shouldn't have to make a leap of faith. And with new CA-Unicenter[®], you don't have to. Because CA-Unicenter is the single, integrated systems management solution that solves all of the challenges of managing client/server computing across heterogeneous platforms.

So call today for more information about the systems management software you can believe in: CA-Unicenter.

**Call 1-800-225-5224 Dept. 10307 For More Information
And To Register For The CA-Unicenter Software Giveaway.**

CA-Unicenter[®]

Integrated Client/Server Systems Management Software

© Computer Associates International, Inc., Islandia, NY 11789-7000. Offer good in U.S. and Canada only. All other product names referenced herein are trademarks of their respective companies. Requirements for Software Giveaway available through toll-free number.

Reader Service No. 1

Maybe You Can't Be In Six Places At Once...



Relish Buns

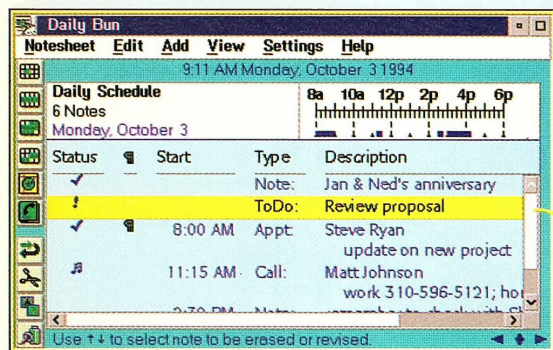
But now your

- Calendar,
- Phone Book,
- To Do List,
- and other personal information can



Relish® 2.2 Has Hot Buns

...a new kind of Workplace Shell object for dynamically viewing Relish information



One bun can show the To Do items remaining for that important project. Another can have all your meetings with Fred. Others for each category in your phone book.

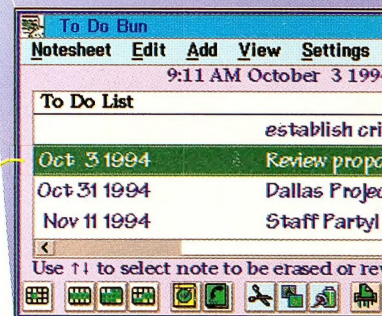
Think of the possibilities.

Put them on your desktop, in folders, anywhere you want them.



Meetings with
Fred Jones

When you want just those project-related To Dos, open that bun and there they are. Need a printed copy? Just drag your bun to a printer without even opening it.



Collections of hot-linked information, customized to meet your needs.



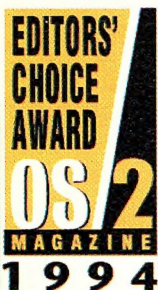
To Do's for
Dallas Project

Information where you need it, when you need it, always up-to-date, always consistent. A sure way to Relish every moment of your day!

Best of all, everything is always up to date.

Make a change one place, and the information is automatically and instantly updated everywhere, right before your eyes!

Only Relish 2.2 Gives You All This



- * NEW! Workplace Shell objects for dynamically viewing information
- * NEW! Iconbar for one-click access to your preferred functions
- * NEW! Type-to-search lets you "just start typing" to find things fast
- * NEW! Floating entries (without times or dates) appear on current date
- * Entries can span any length of time from a few minutes to many days
- * Intelligent time and date recognition gives you quick keyboard entry
- * Alarms can be scheduled as far ahead of an event as you want
- * Quick-access reference calendar can remain on the desktop
- * Reminders are automatic; so is schedule synchronization on a LAN
- * The most extensive drag-and-drop support of any OS/2 program

Relish

Part of Sundial System's "Personal Information Object" strategy for giving you access to information like you've never had it before.

For individuals who want power and reliability.

For workgroups with dynamic and complex needs.

Sundial Systems Corporation

310•596•5121

909 Electric Ave, Suite 204,
Seal Beach, CA 90740 USA

©1994 Sundial Systems Corporation. All rights reserved. Relish is a registered trademark and Bun, "Personal Information Object" and "Type-to-Search" are trademarks of Sundial Systems Corporation. OS/2 and Workplace Shell are registered trademarks of International Business Machines Corporation.

Table of Contents

Volume One Number Ten
October 1994

OS/2
MAGAZINE

Cover Story

22 Rolling your Own CD-ROM

So, you have a few hundred megabytes of data sitting around. Wouldn't it be great to make your own CD-ROM discs to store that data, or to distribute it to branch offices or customers? Of course it would, if the time value of your data justifies the costs, or if you plan to make enough discs to amortize the set-up charges. Here's a handy primer on the basics of going from hard disk to compact disc.

By Guy Wright.

Features

32 The 1994 Editors' Choice Awards

In our first annual product awards, the editors of *OS/2 Magazine* recognize 16 products that make OS/2 stand out. Our selection of 13 outstanding software packages and three books are products that are in use today, are recommended enthusiastically by their users, and demonstrate the advantages of using OS/2. *By Alan Zeichick*

39 OS/2 vs. Advanced Graphics Boards

Why does OS/2 recognize your super-VGA graphics board during the installation process, and then set you up with 640 x 480 x 16 colors? What can you do about it? Where can you find OS/2 drivers for your SVGA board? What if OS/2 drivers aren't available for your board? Here are the answers. *By Scott Vouri*

Departments

7 Perspectives

Our question is, why was Stewart Alsop such a popular keynote speaker at OS/2 World?

9 Letters

Where are the OS/2 games? How can OS/2 users help Team OS/2 evangelize? How could we forget to credit a reader for submitting a REXX tip?

11 Dateline: OS/2

IBM shows parts of its future.

45 Just Announced

The latest news about the latest OS/2 hardware and software.

Reviews

42 The Graham Utilities

Remember The Norton Utilities, a bunch of individual tools for DOS? The Graham Utilities has brought The Norton Utilities, circa version 3 or 4, to OS/2.

By Esther Schindler

Columns

13 The Big Picture

"What does Multimedia really mean?" asks Amy Wohl. Does it mean any old graphics program? Must multimedia include animation, voice and music? It all depends . . .

17 Test Drives

On Brian Proffit's review list: SkyScraper 1.0, a desktop organizer that offers powerful program launching and SpaceMap 1.1, a utility that shows you all the space on your new hard disk.

49 The REXX Column

Dick Goran talks about the REXX parse instruction, which separates strings into component parts; trap processing; and registering external modules.

55 Information Center

Just because you're using an HPFS disk partition doesn't mean you can finally forget about three-letter file extensions. Dick Conklin discusses HPFS and FAT naming conventions.

59 Under the Hood

Why is it so difficult to deal with serial ports? Mark Minasi explains how DOS and OS/2 programs work with serial ports.

63 Tips & Tricks

David Reich tells us how to boot Win-OS/2 without ATM, deal with hangs and Trap 2 errors, maximize our prompts, and decide about using the SIO comm drivers.

69 The View from Canopus

A new version of OS/2 means a brighter future than ever before. Why? Will Zachmann says it's because of technical improvement in the core product and the removal of superficial limitations.

72 End Notes

Our book reviewer, Stan Kelly-Bootle, looks at Ronny Richardson's *OS/2 Batch Files to Go*.

Editor-in-Chief
ALAN ZEICHICK

Managing Editor
GEORGE WALSH

Technical Editor
GUY WRIGHT

Assistant Editor
ALEXANDER ANTONIADES

Editorial Assistant
ANNE MELLINGER

Art Director
DAVID BERGERON

Contributing Editors

DICK CONKLIN
STAN KELLY-BOOTLE
MARK MINASI
DAVID MOSKOWITZ
BRIAN PROFFIT
DAVID REICH
ESTHER SCHINDLER
AMY WOHL
WILL ZACHMANN

Publisher
TED BAHR

East/Midwest Sales Manager

JAMES KAVETAS (212) 626-2546

East/Midwest Sales
LISA KRAUS (212) 626-2448

Western Sales Manager
CATHERINE MCCONVILLE
(415) 905-8115

Western Sales
MOLLY KNOX (415) 905-8126

Advertising Production Coordinator
JON SHURKIN

Marketing Manager
HEATHER CHAN

Circulation Manager
SARA DECARLO

Newsstand Manager
PAM SANTORO

Subscription Questions
(800) 765-1291

Reprints
ANDREA VARNI (415) 905-2552

Postmaster
SEND ADDRESS CHANGES TO: OS/2
MAGAZINE, CIRCULATION DEPARTMENT,
PO Box 56664, BOULDER, CO 80323-
6664. TELEPHONE (800) 765-1291.



A United Newspapers publication

EDITORIAL POLICY: OS/2 MAGAZINE IS AN
INDEPENDENT PUBLICATION WITHOUT OBLIGA-
TION TO ANY HARDWARE OR SOFTWARE VENDOR,
DEALER, OR DISTRIBUTOR. SEND EDITORIAL
QUERIES TO OS/2 MAGAZINE, EDITORIAL
DEPARTMENT, 600 HARRISON ST., SAN
FRANCISCO, CA 94107.



Chairman of the Board
GRAHAM J.S. WILSON

President/CEO
MARSHALL W. FREEMAN

Executive Vice President
THOMAS L. KEMP

Senior Vice Presidents
H. VERNE PACKER
DONALD A. PAZOUR
WINI D. RAGUS

Vice President/CFO
WARREN A. AMBROSE

Vice President/Administration
CHARLES H. BENZ

Vice President/Production
ANDREW A. MICKUS

Vice President/Circulation
JERRY OKABE

Vice President
Electronics/Design Unit
TED BAHR

Postal and Rates
SECOND-CLASS POSTAGE IS PENDING AT
SAN FRANCISCO, CA, AND ADDITIONAL
MAILING OFFICES. OS/2 MAGAZINE (ISSN
#1073-1547) IS PUBLISHED MONTHLY BY
MILLER FREEMAN INC., 600 HARRISON
ST., SAN FRANCISCO, CA 94107.

DOMESTIC SUBSCRIPTION RATE FOR ONE
YEAR IS \$39.95; TWO YEARS, \$64.95.
CANADA RATES FOR ONE YEAR ARE \$49.95;
TWO YEARS, \$74.95 (PAYABLE IN U.S.
FUNDS). FOR ALL OTHER COUNTRIES, THE
RATE FOR ONE YEAR IS \$79.95 AIRMAIL
(PREPAYMENT IN U.S. FUNDS). SINGLE-
COPY PRICE (U.S.) IS \$7.00 PLUS \$2.00
POSTAGE; INTERNATIONAL, \$10.00
INCLUDING POSTAGE.

ALL MATERIAL COPYRIGHT©1994 BY
MILLER FREEMAN INC. ALL RIGHTS
RESERVED.
PRINTED IN THE U.S.A.

ABC MEMBERSHIP APPLIED FOR
OCTOBER 1993

Your satisfaction matters:

OUR CUSTOMER-SERVICE STAFF IS
DEDICATED TO MAKING SURE YOUR
SUBSCRIPTION TO OS/2 MAGAZINE IS
HASSLE-FREE. IF YOU MISS AN ISSUE,
HAVE A BILLING PROBLEM, WANT TO
RENEW YOUR SUBSCRIPTION, OR JUST
HAVE A QUESTION:

CALL US!

CUSTOMER-SERVICE OPERATORS ARE
STANDING BY 24 HOURS A DAY.
(800) 765-1291

Reaching the OS/2 Magazine Editors

THE EDITORS OF OS/2 MAGAZINE ARE ALWAYS
INTERESTED IN YOUR QUESTIONS AND SUGGES-
TIONS, PRAISE OR CRITICISM. OUR MAILING
ADDRESS IS EDITORIAL DEPARTMENT, OS/2
MAGAZINE, 600 HARRISON ST., SAN
FRANCISCO, CA 94107. OUR MAIN SWITCH-
BOARD IS AT (415) 905-2200, AND THE OS/2
MAGAZINE FAX NUMBER IS (415) 905-2499.

Electronic Mail

COMPUSEVE MAILBOXES CAN ALSO BE REACHED
THROUGH OTHER ELECTRONIC SERVICES. FOR
EXAMPLE, THE FORMAT IS 76703.756@COM-
PUSERVE.COM FROM THE INTERNET.

ALAN ZEICHICK	76703,756
OR	ZEICHICK@ACM.ORG
GUY WRIGHT	GWRIGHT@MFI.COM
ALEXANDER ANTONIADES	71154,676
OR	OS2MAG@MFI.COM
DICK CONKLIN	76711,1005
STAN KELLY-BOOTLE	SKB@CRL.COM
MARK MINASI	71571,264
DAVID MOSKOWITZ	76701,100
BRIAN PROFFIT	75300,1466
DAVID REICH	76711,632
OR	SPEEDRACER@VNET.IBM.COM
ESTHER SCHINDLER	72241,1417
WILL ZACHMANN	76004,3657
CUSTOMER SERVICE	71572,341

CompuServe

OS/2 MAGAZINE EDITORS CAN BE REACHED ON
THE OS2AVEN FORUM ON COMPUSEVE. IF
YOU'RE NOT FREQUENTING THE VARIOUS OS/2-
RELATED COMPUSEVE FORUMS, YOU'RE MISSING A
USER FORUM OR OS/2 MAGAZINE READERS, WRIT-
ERS, EDITORS, AND THE ENTIRE OS/2 COMMUNITY
TO GATHER ELECTRONICALLY. IF YOU'RE A
COMPUSEVE MEMBER, YOU CAN VISIT THE FORUM
BY TYPING GO OS2AVEN AT THE COMMAND
PROMPT. YOU'LL BE GIVEN THE OPPORTUNITY TO
JOIN THE FORUM. GO AHEAD—THERE'S NO
CHARGE BEYOND NORMAL COMPUSEVE RATES.

TO LEAVE FEEDBACK FOR OS/2 MAGAZINE EDI-
TORS, TYPE GO MAIL AND SEND ELECTRONIC
MAIL TO THE ADDRESSES LISTED ABOVE. DON'T
BE PASSIVE! IF YOU'RE NOT A COMPUSEVE
MEMBER, HERE'S HOW TO JOIN:

■ SET YOUR COMMUNICATIONS SOFTWARE FOR
300, 1200, 2400, OR 9600 BITS PER SECOND
(BPS), 7 DATA BITS, EVEN PARITY, 1 STOP BIT,
AND FULL DUPLEX.

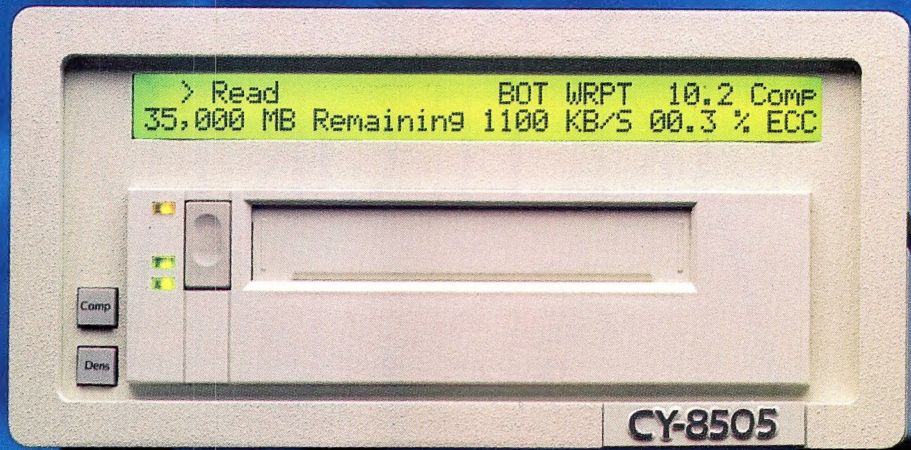
■ TO FIND THE NUMBER NEAREST YOU, DIAL
800-346-3247 WITH YOUR MODEM (IN
CANADA, DIAL 800-635-6225, VOICE ONLY).
WHEN THE MODEM CONNECTS, PRESS ENTER. AT
THE HOST NAME PROMPT, ENTER PHONES.
FOLLOW THE MENUS AND NOTE THE NUMBER
CLOSEST TO YOU. THEN HANG UP AND DIAL THE
NUMBER YOU HAVE JUST FOUND.

■ ONCE YOU'RE CONNECTED, PRESS CTRL-C.
THEN ENTER THE FOLLOWING INFORMATION AT
THE PROMPTS:

HOST NAME:	CIS
USER ID:	177000,5605
PASSWORD:	COMPUSEVE
AGREEMENT #:	CADENCE
SERIAL #:	93015

AFTER ENTERING YOUR BILLING INFORMATION, TYPE
GO IBMOS2 FOR A MENU OF THE VARIOUS OS/2-
RELATED FORUMS. NOTE THAT COMPUSEVE BILLS A
MONTHLY FEE PLUS HOURLY CONNECT-TIME CHARGES.

The Only 35 GB Tape Drive With Fast SCSI Compression



All tape subsystems are not created equal. Only the CY-8505 can give you capacity of up to 35 GB and transfer rates as fast as 90 MB per minute.

That's because the CY-8505 is the only tape subsystem that features switch-selectable, Fast SCSI Compression. So you get the highest performance possible — and the lowest cost per megabyte.

A MTBF of 160,000 hours ensures reliability. The bit error rate of less than 1 in 10^{17} is the best in the industry. A backlit display gives you complete status information, including command under execution, transfer rate, compression ratio, tape remaining, and more.

The CY-8505 is the most advanced tape subsystem on the market, and it offers the most innovative options.

True Compatibility With:

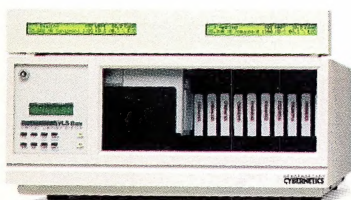
Alliant	DEC TU/TA81	NCR	Silicon Graphics
Alpha Micro	DEC Unibus	NeXT	STC
Altos	Gould/Encore	Novell	Stratus
Apollo	HP	OS/2	Sun
Arix	IBM AS/400	PS/2	Texas
AT&T	IBM Mainframe	Parallel Port	Instruments
Basic-4	IBM RISC/6000	PC 386/ix	Unisys
Concurrent	IBM RT	PC MS-DOS	Ultimate
Convergent	IBM S/38	PC Xenix/Unix	Wang
Data General	ICL	Perfec	Windows NT
DEC BI-Bus	Intergraph	PICK	— and more
DEC SCSI	Macintosh	Plexus	
DEC DSSI	McDonnell	Prime	
DEC HSC	Douglas	Pyramid	
DEC Q-Bus	Motorola	Sequent	

uniquely encoded card keys; and the *Advanced SCSI Processor* allows multiple drives to work together in striping, mirroring, cascade and independent modes. You can even copy and verify tapes off-line.

Compatible with virtually every computer system and network, the CY-8505 is available in a single or dual desktop unit, in a rack mount configuration, or as part of a tape library system that can store as much as 3 TB.

Backed by a two year warranty and our responsive in-house technical support group, the CY-8505 is fast setting the pace in data storage.

For more information, call today at
(804) 873-9000.



Our CY-CHS10A features two tape drives and can store up to 385 GB on eleven tapes — without tape handling.

Fast SCSI Compression can increase the native 7 GB capacity by as much as five times; *Accelerated File Access* (for Unix systems) allows you to locate a file in an average of 85 seconds; *Data Encryption* lets you control access to sensitive data through the use of

C O N T E M P O R A R Y
CYBERNETICS

UNTIL NOW, YOUR CHOICES FOR OS/2 BACK-UP WERE TAKE IT, OR LEAVE IT.



Unfortunately,
"like it" wasn't

always an option. Because

until now you've been

force-fed the same

flavor of OS/2™

backup. And it

hasn't exactly

been gourmet fare. It's more likely that they've been feeding you a port

of a Windows product and passing it off as native OS/2. But now there's

an alternative to leftovers: Cheyenne ARCsolo™ for OS/2 from Cheyenne.

ARCsolo is the first substantial native OS/2 backup solution. With an

Chez Spud

~ APPETIZERS ~

Potatoes on the Half Shell
Potato Sampler
Potato Kabobs
Antipotato
Potato Paté with Garlic Toast
Hearts of Potato Salad
Caesar Potato

~ ENTREES ~

Served with French Fries
Old-Fashioned Potatoes
Oven-Baked Potatoes
Potatoes Under Glass
Filet of Potato with Bernaise
Potato Wellington
Rack of Potato
Blackened Cajun Potato
Potato Pilaf

~ HOUSE SPECIALTIES ~

Potato Chowder
Potato Casserole with Gravy
Potato Soup
Potato Stuffed Peppers
Potato Fritters
Potato Pancakes

~ DESSERTS ~

Potato à la Mode
Potatoes Topped
Potato Sherbet
Potato Split
Potato Custard
Potato Mousse
Fresh Potatoes and Cream

~ WINES ~

Chenin Potat 1989
Fumé Potat 1991
Potat Sarah 1992
Cabernet Potat 1990
Hearty Potat 1993
Potat Classico 1988
House Wines by the Glass
Potat Brothers Red & White

interface similar to the user-

friendly Presentation Manager

and Workplace Shell front-ends,

ARCsolo features drag-and-

drop functionality, and an

object-oriented approach.

For users, that means less

training and easier operation. And

ARCsolo's multi-threaded engine performs simultaneous operations and

provides higher performance, so it's faster than whatever you

have on your plate. To order a helping, call 1-800-243-9462.

And satisfy your hunger for a true native OS/2 backup.



CHEYENNE

NEW YORK · PARIS · LONDON · MUNICH · TOKYO

ARCsolo and Cheyenne are registered trademarks of Cheyenne Software, Inc. All other trademarks or registered trademarks are the properties of their respective holders. ©1994 Cheyenne Software, Inc. All rights reserved. *Outside North America, please dial (516) 484-5110.

Perspectives

Evaluating an Operating System

At most OS/2-related conferences, you're likely to find an OS/2 executive giving the welcoming keynote address. Not at OS/2 World, held mid-July in Santa Clara, Calif.—we invited Stewart Alsop, the outspoken skeptic and Editor-in-Chief of *InfoWorld*, to kick off the event.

Alsop offered an “interested onlooker’s” view of the OS/2 community, starting by recounting OS/2’s origins as a joint project between Microsoft and IBM (and, he reminded the audience, a project IBM hampered early on by insisting on 80286 compatibility despite Bill Gates’ urging for a minimum 80386 platform). He held the audience riveted when he hit his main topic: a description of four important criteria for evaluating an operating system, along with an assessment of OS/2’s score. There were few surprises in Alsop’s words, even for IBM’s OS/2 executives in the audience. The four crucial items on Stewart Alsop’s shopping list were:

- **Applications stream:** It’s not sufficient to cite 2,000+ shipping OS/2 applications, and thereby declare OS/2 a success. Customers want lively new stuff: new applications unique for this platform, up-to-date ports of best-selling tools on other platforms, and frequent revisions and upgrades to existing OS/2 applications.
- **Control:** End-users like to feel involvement in their personal computer. They like to personalize their desktops or be able to store data on their local hard disks. Another key control element is the right to choose which applications will be run, and have the power to install them (at least for users who have the time or interest).
- **Reassurance:** Why are so many people asking about IBM’s commitment to OS/2? Because individuals and companies want to know if their platform is here to stay, and if it’s continuing to grow and evolve. Also important: indications that new technologies, such as speech recognition, will be integrated into the operating system.

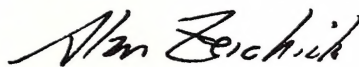
- **Useful Performance:** Alsop didn’t talk about benchmark scores, but about the combined ability of hardware, operating system, and applications software to get users from Point A to Point B.

On the whole, we judge Alsop “OS/2-friendly.” He’s even an OS/2 user now—well, he’s installed OS/2 on one of his many PCs (ahh, the life of a computer-industry editor). Let’s hope that OS/2 becomes his preferred operating system. So, welcome, Stewart, and thanks.

If you turn to p. 67, you’ll notice a new addition to *OS/2 Magazine*’s monthly lineup: Will Zachmann, president of Canopus Research and host of CompuServe’s ragingly popular CANOPUS forum, will offer his insights into OS/2’s past, present, and future. Will is a well-known figure in the OS/2 community, having served in the past as Senior Vice President for Corporate Research at International Data Corp., and as a former columnist for *PCWeek* and *OS/2 Professional*.

Two other columnists have recently joined *OS/2 Magazine*’s ranks. In September, Dick Goran began his coverage of personal programming in “The REXX Column.” Dick is the author of the indispensable *REXX Reference Summary Handbook*, and a well-known expert on the language.

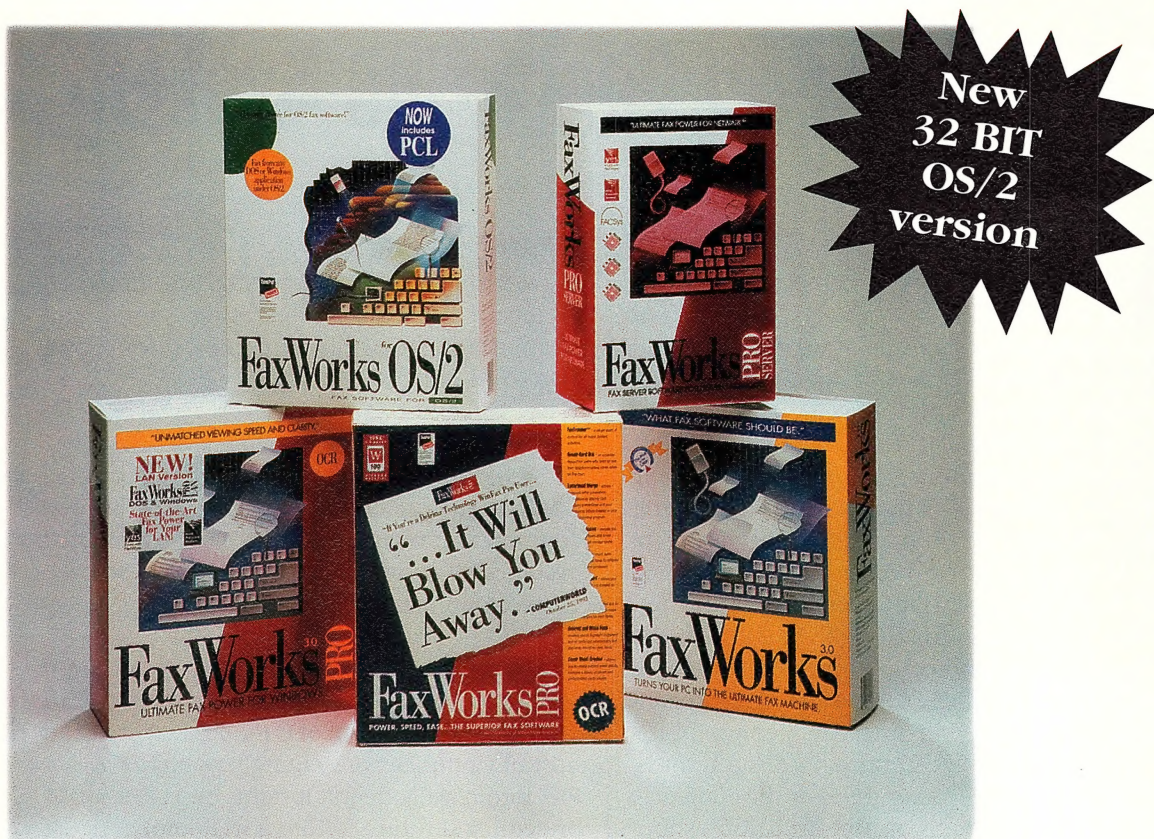
Reviews of OS/2-related books and other printed matter are the topic of “End Notes,” brought to you by Stan Kelly-Bootle, who debuted in our August issue. Stan, an incorrigible wordsmith and impeccable computer scientist, has written literally oodles of computing books, including the incomparable *Devil’s DP Dictionary*.



Alan Zeichick,
Editor-in-Chief



Looking For A LAN Fax Solution?



The FaxWorks™ line of fax software products offers state-of-the art fax power, ease-of-use and advanced fax administration capabilities.

Meet the FaxWorks family of LAN fax software products. An award-winning, value-rich line of fully-integrated PC-based fax software unmatched in its category. FaxWorks provides fax communications products for single and multi-user environments on DOS, Windows, and OS/2 platforms. The FaxWorks family is loaded with values: Including a common user-friendly interface. Outstanding viewing speed and power. Complete scalability. Broad fax hardware support. Ease of installation. And with prices starting as low as \$199, it's no question, the FaxWorks line offers exceptional value.

The Ultimate Fax Power For NetWare! FaxWorks Pro Server is an enterprise-wide fax solution that combines

two award-winning software products - the fax server power of FACSys® with the user-friendly client interface of SofNet's FaxWorks Pro standalone software. Supporting both DOS and Windows clients, FaxWorks Pro Server provides ease of use, FaxTracker™ fax management for compressing and assembling faxes, advanced viewing speed, fax annotation tools, and exceptional document management technology. FaxWorks Pro Server includes multi-phone line support, inbound routing and E-Mail integration.

FaxWorks Pro LAN runs on virtually any network without requiring a dedicated fax server. Send faxes from DOS and Windows with blazing fax viewing speed and powerful fax management capabilities.

FaxWorks Pro LAN provides users with many features including a cover sheet creator, OCR, scanner support, fax logs, phonebooks, annotation tools, and more!

The market leading OS/2 fax solution, FaxWorks OS/2 LAN allows you to fax from any DOS, Windows or OS/2 application. Combine documents from multiple applications, create your own customized cover sheets, have an unlimited number of phonebooks and more! Option available for up to 32 channels.

VAR Value Paks available now to resellers. Call SofNet or your distributor today.

1-800-FaxWorks

SOFNET

1110 Northchase Parkway
Suite 150
Marietta, GA 30067
(404) 984-8088
Fax: (404) 984-9956
Pandar Carreira, Mgr.



Pricing in U.S. dollars, is for U.S. and Canada only. FaxWorks and FaxTracker are trademarks of SofNet, Inc. FACSys is a registered trademark of Optus Software, Inc. All other products are trademarks or registered trademarks of their respective manufacturers. Development tested only. Novell makes no warranties with respect to this product.

Letters

Where are the Games?

Dear Editor:

I have heard that several OS/2-specific games, including ports of current DOS or Windows games, are due to be released during the next few months. Could you provide information on names, companies, and release dates?

Richard Pritchett
via CompuServe

Games are a weak spot for OS/2, but some OS/2-specific games are under development. At press time, OS/2 BlackJack, from Reed Software [(702) 456-3737] is the only game commercially available, but Advanced Idea Machines [(801) 572-4018] is selling beta versions of two native OS/2 games, Galactic Civilizations and SimCity Classic. Rumor has it that other companies are working on games for OS/2, but announcements have not been made.

-Alexander Antoniadis

Chron review review

Dear Editor:

I would like to respond to some of the concerns expressed by Brian Proffit in his column (August 1994, pp. 19-20) regarding the user interface of our product, Chron 4.0. I appreciate the time Brian spent reviewing our product and agree that the user interface is a critical component of an application. Because the basic scheduling function of Chron is included in the Alarms applet of OS/2, it's even more critical that Chron have a compelling user interface.

We have received no complaints from customers about the lack of a menu bar, but if an experienced OS/2 user like Proffit was initially frustrated by the user interface, it is likely that others have been frustrated by it as well.

In response to his comments, we plan to include a menu bar by September. Customers will, however, be able to turn the interface off if they prefer a Workplace Shell-like look and feel. The menu-bar will be included in the next service level as an upgrade at no charge. We plan to examine Proffit's other interface suggestions and will include improvements in subsequent service-level releases.

All feedback about Chron is welcome. I invite customers to join us on CompuServe in the OS2AVEND forum. A combination of customer feedback and magazine reviews provides an opportunity for Hilbert Computing to make Chron the best product it can be.

Gary Murphy
President
Hilbert Computing

Go, OS/2 users, go!

I read your editorial in the August issue (OS/2 Magazine, p. 7). I agree with everything you said in the column, but feel that Team OS/2's efforts are not enough. Microsoft's Chicago is due out soon, and the lemming mentality already shows. Chicago offers nothing OS/2 doesn't already have. But you'd think, by the articles covering it in the general PC press, that Microsoft had attained nirvana.

It's clear that we can't depend on IBM's marketing efforts. Native applications for OS/2 are quite rare, despite the fact that OS/2 has more than five million users. Where are the applications? OS/2 users need to do more to help.

Talk up the advantages and benefits of OS/2 emphasizing fact, feature, and benefit. Every time you go into a computer store, ask for OS/2-specific software. Every time you read a soft-

ware review, write to the editors of the magazine and ask where the reviews of OS/2 software are. We need to buy OS/2 application software. If you can't buy the software you need, write to the manufacturers and ask them for it. Convince one person to switch to OS/2—our ranks would swell from five to 10 million.

By presenting a positive image of OS/2, we will convert the undecided to OS/2. Increased numbers of OS/2 users will encourage programmers to write native applications for OS/2. We have a tough job ahead of us. The Microsoft juggernaut is already picking up steam. If we don't want to be crushed under its wheels, we have to take action.

Rob Spear via CompuServe

I agree with your points, but would add that Team OS/2's efforts and results have been incredible for a volunteer organization. But they are obviously not a substitute for word-of-mouth.

You suggest that people emphasize "fact, feature, and benefit" when talking up OS/2. I would reorder that to "benefit, feature, and fact." Let's make it practical. After all, non-enthusiasts are more interested in "14.4 in the background while printing and simultaneously editing a spreadsheet" than "32-bit preemptive multithreaded multitasking."

-Alan Zeichick

Errata

In the August issue, we featured the REXX program, `swapmon.cmd`, which can be used to monitor the size of the OS/2 swap file ("Tips & Tricks," p. 76). The tip was submitted by Rod Knowlton (jrknowlton@delphi.com); our apologies for failing to give credit where credit is due.



Information Circulates Faster with FormTalk

Everything is moving faster today, and as technology speeds forward, organizations are constantly searching for ways to keep up the pace. Even in the most modern offices, however, productivity often grinds to a screeching halt as employees spend valuable time filling out administrative paperwork. With FormTalk for OS/2, you can easily automate those tasks and fast forward your people into more profitable activities.

FormTalk enables any user connected to a Lan-based electronic mail system to design, fill in, and route all of the forms required in an office environment. In the time it takes you to use your E-mail, you can send forms such as customer orders, expense reports, and time sheets directly to the required approvers. You can even track the forms as they pass through the administrative cycle. Who can design these forms? The answer is — anyone! FormTalk requires no special skills. Its object-oriented interface enables any user to become a forms designer. If your form is complicated, you can

add online help to
enable users to
complete their entries.

If you want to reuse the
form, FormTalk

lets you create a template so it is always available. If you want to reuse the form data, you can easily channel it into your local applications. You also don't have to worry about printing new forms when office processes change. Simply alter your FormTalk forms and business hurries along as usual. Call now to order FormTalk at the special price of \$99 or to get a free demo diskette.

Dial: 1-800-IBM-CALL ext.SA015.

Employee	Phone	Time	Over	Time	Per	Total
		0	0	0	0	0.00
		0	0	0	0	0.00



IBM

* Offer expires December 1 1994

IBM, OS/2, and FormTalk are registered trademarks of International Business Machines Corporation.

IBM Shows Parts of the Future

**TALIGENT'S APPLICATION FRAMEWORKS
AND CI LABS' OPENDOC GO ALPHA BY ALEXANDER ANTONIADES**



Over the past several years, IBM has entered a number of strategic alliances to develop industry standards, and some of these efforts are finally starting to bear fruit. IBM, as an investor in two of these new innovations, is gaining early access to these emerging standards.

The first piece of technology is OpenDoc, a compound-document application programming interface (API), which is similar in concept to Microsoft's object linking and embedding (OLE) 2.0. This project is being coordinated by Component Integration Labs in San Francisco, Calif., which is jointly owned by Apple, IBM, and WordPerfect. IBM will be responsible for the OS/2 implementation of OpenDoc, WordPerfect will do the Windows version, and Apple will do the Macintosh version.

According to Component Integration Labs, OpenDoc will enhance OS/2's inter-application integration, allowing interaction not only between OS/2 applications, but across other platforms as well. OpenDoc is designed to complement OLE in design, so that programs can adhere to both specifications. In theory, an OpenDoc-compliant Windows program, running seamlessly on the Workplace Shell desktop, should be able to interact with an OpenDoc-compliant OS/2 program.

IBM has been demonstrating OpenDoc since PC Expo in New York last July. The demo consists of

some OpenDoc parts (a clock and a spreadsheet component) that are inserted into a dummy OpenDoc application. CI Labs expects OpenDoc for OS/2 to be ready by early 1995, at which point it can be incorporated into a new version of OS/2.

The other major technological advancement, Taligent, will have a profound effect on not only OS/2, but the entire industry if it is successful. Taligent, a joint venture between IBM, Apple, and Hewlett-Packard, is an off-shoot of technology that Apple was working on for a number of years.

Taligent's original goal was to build a whole new operating system, but the current implementation is what Taligent is calling Application Frameworks. The Application Frameworks are a compilation of C++ objects that can be reused by applications running on top of the Frameworks. The idea behind this approach is that applications tend to use the same features over and over again (for example, most programs contain a window that you can type in to change fonts).

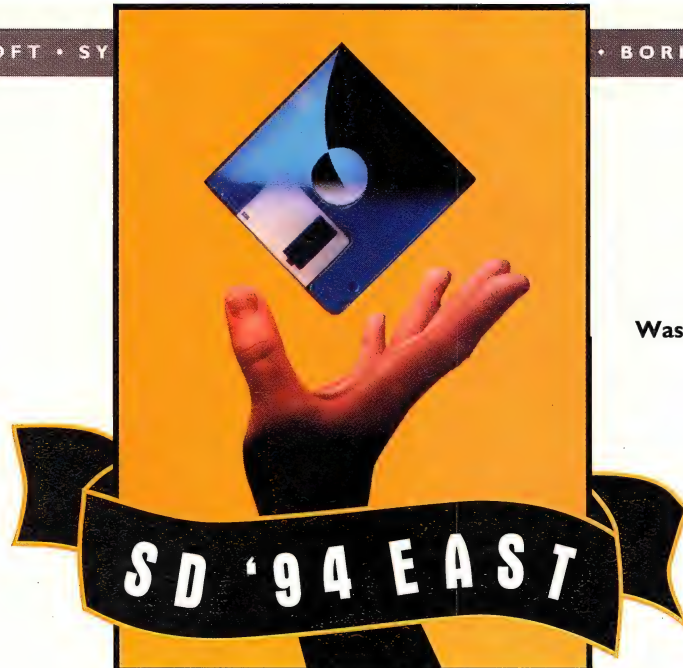
In a Taligent world, applications would all share what Taligent calls "common DNA." This would cause applications to be much smaller (since they would mainly be molding existing Taligent code) and would allow for a high level of application integration. An example of this technology would be a personal-information manager that called a word processor part, any

time it needed to edit text.

The first public demonstration of Taligent was shown at Object World in San Francisco Calif. on July 28, 1994. The demonstration showed the Taligent Application Frameworks on an RS/6000 running AIX 4.0, a PC running Windows NT, and an unknown version of OS/2 running on a PC. The demonstration showed a series of applications that all used a common tool bar and were easily embedded in one another, then sent across an Ethernet network.

What was interesting about the OS/2 version was that all of the other versions were running in windows on the various desktops and the OS/2 version was running seamlessly on the Workplace Shell. Taligent has announced that the Taligent Application Frameworks will be available for OS/2 during the first half of 1995, making OS/2 one of the first operating systems on which it will be deployed.

IBM has hinted that Taligent and OpenDoc will be bundled into a future version of OS/2, but have not provided a time frame or version number. The latest rumors suggest that the OS/2 release that will incorporate these features will be the so-called "Enterprise" version, due out in early 1995. So, it seems that just as OS/2 Personal is gearing to take on Chicago (Windows 4.0), IBM hopes that Taligent and OpenDoc will help OS/2 combat Microsoft's next big release, Cairo (Windows NT 4.0).



Conferences,
October 3 - 7, 1994
Exhibition,
October 4 - 6, 1994

Washington Convention Center
Washington D.C.

Come See the Software and Application Development Industries Come Alive!

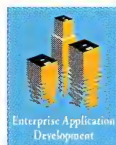
"The best speakers, the best demonstrations, and the best exhibition!" Terry McIntosh, Analyst - Chevron Corp.

SD '94 East delivers development solutions across the spectrum of tools from C++ to Powerbuilder.

- Client/Server Tools
- Object-Oriented Tools
- Rapid Application Development Tools
- Database Design and Modeling Tools
- CASE Tools
- GUI Front Ends
- Languages
- Configuration Management Tools
- Testing and Debugging Tools
- Porting Tools
- Multimedia Tools

SD '94 East provides powerful, real-world, real-time education in 4 jam-packed conferences.

SD was the first and continues to be best at bringing you practical, unbiased guidance in over 200 classes across 17 tracks.



Join us at SD '94 East as the industry comes alive...

...on the show floor, in the conference sessions and in a series of special events with key industry players.

- 4 Plenary sessions include:
Mitchell Kertzman, CEO, Powersoft
Christine Comaford, *PC Week*
Vaughan Merlyn, Partner, Ernst & Young
- Hours of free technical sessions by Microsoft, Powersoft, Intersolv and others
- The C++ Programming Superbowl



Tools and Techniques for Software and Application Developers

Call for a Brochure!

1-800-441-8826
415-905-2784
Internet: sd94east@mfi.com
FAX: 415-905-2222

Reader Service No. 7

Multimedia Comes of Age

**WILL THE CD-ROM USHER IN A NEW ERA
IN MULTIMEDIA CREATIVITY?**

BY AMY D. WOHL



You may think multimedia is all about video, animation, sound, and color. I may value it more for its ability to offer new methods for organizing, accessing, and displaying complex information. Both of us are right. Recently, I judged just a small portion (about 15 percent) of the 650 entries in a multimedia contest. My job was to look at the ones intended to help sell products and, by and large, they did that very well. However, the best multimedia productions I saw were the ones that tried to solve specific problems and looked at multimedia as a potentially useful tool. Most of the really bad multimedia I've seen—judging or just looking—tries to take some neat special effect and find something to do with it.

Semantically, the term *multimedia* caused my fellow judges and me the most problems. We're not sure what it is and neither is anyone else. Is *any* graphics program multimedia? Or must it include voice? What about motion? Okay, what about a series of screens that let users make a touch-screen selection from a text list? If the backgrounds are in color, and music is playing, is that multimedia? We didn't think so, even though it was clearly interactive and made use of multiple sensations (vision, hearing, touch). Something (aesthetics, I suspect) was missing. What exactly do we expect from multimedia?

**Soon, all of us
will find text-only
screens or still
graphics too static to
retain our attention.**

Multimedia tools can greatly enhance many kinds of business communication by providing better information or by simply making the information recipient more attentive to the facts at hand. Let's face it, learning how to perform a business chore and selecting the proper components for a customer presentation isn't all that interesting.

Some information can only exist in multimedia form. For example, training that lets you use the computer while seeing information on how to use the computer at the same time, using animation and sound to guide your eyes and attention to the proper place. Or, think of a brainstorming exercise, where the user (singly or in a group) uses a multimedia tool to move through an art museum, letting the visual ideas provoked by one painting guide him to his next selection—all in the hopes of finding the right image for your company's next ad campaign.

Our viewing habits change quickly. The eye becomes accustomed to new levels of technology and new fashions. To our children, anything below the production level of a slick TV commercial looks amateurish. Soon, all of us will find text-only screens or still graphics too static to retain our attention. TV has trained our eye for dynamic movement, rainbow color, and lively sound. We find messages packaged in these trappings much more interesting than black ink marks on white paper—or their electronic imitation.

If the move to multimedia is on, what are we doing about it? Much of the successful effort so far has been in the games market (which we won't dwell on here). In the business market, efforts tend to be divided between education and training, presentations (both in-house and customer), and marketing.

Education and training uses of multimedia are again divided between materials produced by training companies for sale (usually at a profit) and in-house produced courseware. Issues of production values versus production cost are different here, but the availability of easy-to-use tools, in a market where the courseware developers are teachers or artists—but not programmers—is critical.

Presentations are, of course, produced in a customized fashion, but they could be produced in-house, using simpler multimedia tools or outsourced to a graphics produc-

tion facility where trained multimedia artists will prepare a more elaborate (and costly) production, both of which will be expensive, in time as well as money.

In the marketing arena, OS/2 is a popular platform for servers for multimedia kiosks. In this environment, software is often provided to support information-on-demand (perhaps to tourists or visitors), point-of-sale assistance (including the ability to accept and process orders), electronic message input and delivery, coupon display and printing, and a variety of customer and client-service applications.

Some OS/2 graphics packages and multimedia development tools permit users and professional developers (mainly professional developers) to create compelling presentations, seductive training modules, and revenue-producing sales and marketing pitches. While it's true that much of the multime-

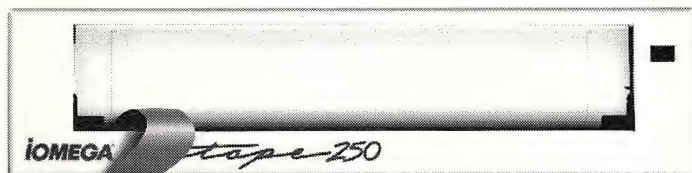
dia software blitz has been reserved for mainstream client platforms like Windows or the Macintosh graphics niche, there's plenty here to keep an OS/2 shop happy. Of course, Windows programs (need we add), can always be run under OS/2, if you need an extra feature.

All of these multimedia software goodies are highly dependent on the availability of CD-ROM drives (and drivers) and sound boards to play the results of all this effort. Here, the news is very good. Sales of desktop PCs with CD-ROM drives are up sharply. We expect that most new business and home desktops will be sold CD-ROM-equipped by the end of next year. In the after-market of existing installed machines, add-on CD-ROM drives are selling briskly, which is not a problem if you're installing a kiosk system where the system integrator will provide appropriate hardware with the software. However, if you want to sell training

or mail a marketing presentation to customers, knowing they'll have CD-ROM drives available is critical.

It's also likely that our concept of multimedia is transitory. What strikes us as elegant and seductive today may be merely ordinary in a few years as the eye retrains itself. Who can imagine what splendors may yet await us. If Corel can offer clip libraries with 22,000 still images or thousands of photos, just wait for the explosion of video clips and animations and sound that is sure to follow, turning us into erstwhile Hollywood producers and empowering real artists to create strange new worlds.

Amy D. Wohl is president of Wohl Associates, a consulting firm specializing in office information systems, personal computing, and end-user computing. She is also editor of the Trendsletter, a monthly newsletter on computer industry trends.



OS/2 WINDOWS DOS

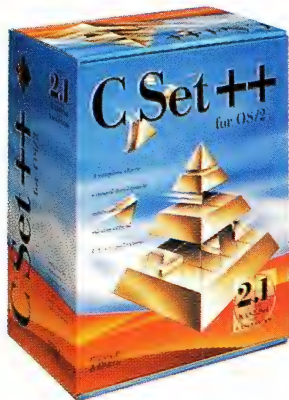
**WE'VE MADE IT
A POINT TO MAKE
SHARING DATA ACROSS
PLATFORMS EASY.**

Now there is a tape drive system that goes beyond just backing up your data. It also lets you share data across different platforms—be it OS/2, DOS or Windows. Thanks to ingenious software that reformats the data into the resident environment. And it does it all transparently. Plus, Iomega® tape drives come with the only 5-year warranty in the industry. So if you're looking for a tape drive, make it a point to check out Iomega. For a dealer near you, call **1-800-777-4236**.

IOMEGA®

©1994 Iomega Corporation. Iomega and the Iomega logo are registered trademarks and Tape250 is a trademark of Iomega Corporation. OS/2 and Windows are trademarks of their respective holders.

Their Choice Should Be Your Choice!



BONUS BUNDLE OFFER FROM SOFTMART!



IBM's C Set++™ Version 2.1 is the most comprehensive C/C++ development package you can buy for OS/2 and recently received a 1994 OS/2 MAGAZINE Editor's Choice Award at the OS/2 World Conference & Exhibition.

Now for a limited time you can purchase the C Set++ BONUS BUNDLE from Softmart at a special price.

C Set++ can dramatically slash your programming time with an intuitive graphical interface and world-class optimization. Your applications are quick to build, fast to execute and easier than ever to modify.

C Set++ brings you the most complete set of class libraries and tools available for OS/2 development. It includes:

- A User interface class library and Collection Classes
- Visual debugger and Execution Trace Analyzer
- Class Browser and Workframe/2™ Version 2.1
- The IBM Developer's Toolkit for OS/2

.....everything you need to make C/C++ development faster, easier and more hassle-free than ever before.

Now, when you purchase the C Set++ CD-ROM, you will also receive OS/2 for Windows™, the KASE Set™ GUI builder and the revolutionary Experience C++ tutorial ... and all for just \$197.

KASEWORKS™ KASE Set provides an introductory level GUI builder, speeding the pace of your developments...and your learning.

Experience C++™ is the only leading-edge multimedia tutorial that lets you look and listen to detailed descriptions of every aspect of C++.



CALL SOFTMART AT 800-272-6519



\$197

TO ORDER TODAY:

Softmart product codes:
PTIBM83 CD Bonus Bundle
PTIBM67 3.5 Standalone
PTIBM68 CD Standalone

Offer valid through October 31, 1994. Prices and products are subject to change without notice. Prices do not include shipping and handling. Sales tax charged where applicable. IBM and OS/2 are registered trademarks and C Set ++ is a trademark of International Business Machines Corporation. All other product names are trademarks of their respective. Softmart is a registered service mark of Softmart, Inc. COPYRIGHT © 1994. Softmart Inc.

The eagle
has landed...

PREDITOR/2

THE EDITOR FOR UNTAMED PROGRAMMERS

on "planet OS/2". Introducing PREDITOR/2.

Your source code has never fallen prey to a more powerful editor. PREDITOR/2 is for developers who don't have the time to deal with rigid programming environments, who must change facilities to fit their exact requirements and who need to dramatically extend editing functions to attain peak productivity. This editor stalks code with the speed and versatility of a true predator.

HIGHLIGHTS:

- CUA-compliant GUI
- Multiple document interface
- BRIEF, VI, EMACS, ISPF, CUA emulation
- WorkFrame/2 integration
- Built-in compiler support
- Extensive customization facilities
- Powerful C-like extension language
- Unlimited Undo and Redo
- Powerful search and replace functions
- No limits on file sizes, buffers or windows

Special Introductory Price... \$149.00 • MSRP \$249.00

To order PREDITOR/2 or to receive a brochure, call now. 1-800-535-8707 or fax: 1-810-737-7119

PREDITOR/2 is a trademark of Compuware Corporation. All other company or product names are trademarks of their respective owners.
© 1994 Compuware Corporation.


COMPUWARE
Sophisticated Software Used Every Day
Reader Service No. 10



Skyscraping a Space Map

SKYSCRAPER 1.0 AND SPACEMAP 1.1 BY BRIAN PROFFIT



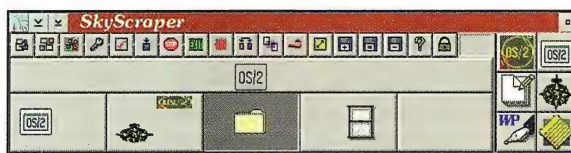
SkyScraper 1.0

Most people agree with IBM's description of the Workplace Shell as the "messy desk" approach. It's certainly a lot more productive to leave windows open, instead of continually closing them to make room on the desktop. Minimizing and restoring is faster, but it still is not as smooth as it could be. In the July issue ("Test Drives," p. 19-20), we looked at QwikSwitch, a product that provides a keystroke-based method around the problem. SkyScraper goes one step further, combining hot keys with visual cues to help you organize and navigate your desktop.

SkyScraper's name comes from the metaphor it is based on—that of an office building. Like a typical office building, SkyScraper presents several floors, each of which holds a number of desks. Each desk is a separate virtual OS/2 desktop. Other products, such as Collage PM and 9 Lives have used the virtual-desktop technique, but Binar Graphics has added some interesting twists to SkyScraper.

Desktop organization plus program launching

The SkyScraper window appears on each virtual desktop. It contains buttons that allow you to move quickly to other desks on the same floor or switch to a different floor and its desks. This desk/floor



metaphor has some advantages over other multiple-screen management techniques. Just as it is easier to find things on your hard disk if you organize the files into folders/directories, it is easier to organize your virtual desks by keeping them on different floors. You might have a Finance floor with a spreadsheet desk, a notepad/calculator desk, a Productivity floor with a PIM desk, an e-mail desk, and so on.

A special floor is reserved for full-screen sessions—a feature that makes it easy to move directly to the session of your choice. It would be great if moving back was as easy, but for that you'll have to use OS/2's <Alt+Esc> or <Ctrl+Esc> sequences. You can define hot keys for individual desks and use the predefined hot keys to switch between desks. Most of the time, though, the application intercepted the keystroke and the hot key failed.

A Program Launcher section of the window is also provided. Copying the icons of your favorite applications to this area allows you to quickly open them from any desktop with a single (not double) click—a better alternative to minimizing or closing several windows so you can open a folder that

encloses another folder that encloses your application. It's also easier to use the visual cues of the program's icons instead of trying to remember a contrived hot-key combination as used by QwikSwitch. And, as we noted before, those hot keys are often intercepted by the active application before they get to the program switcher.

The real beauty of SkyScraper (particularly if you are running at 640 x 480) is that you can run all of your applications maximized at the same time and still be able to switch between them easily. All you have to do, once you have installed SkyScraper, is open all of your favorite applications at the same time and use SkyScraper's Arrange option to move each of them to a different desktop. The individual desk buttons in SkyScraper's window show the applications' icons and their relative position on each desk. They're smart icons too—clicking on a desk button doesn't just switch to that desk. If you clicked on a specific application's icon within that desk, SkyScraper makes it the active window when it switches desks.

Of course, you may want a particular application (a clock or phonebook, for example) on all of your desktops. SkyScraper allows you to define an application as shared, which will make it appear on all desks. Once you get all of

your desks configured the way you want them, save the layout and SkyScraper can move your windows to those sizes and locations the next time you boot OS/2.

By the way, if you're accustomed to using the Window List to switch between sessions, you can still do so. SkyScraper automatically switches you to the correct desk for the session you select from the list.

The real-estate screen dilemma

Unfortunately, SkyScraper contains a bit of a Catch 22. The more strapped you are for desktop space, the more you need SkyScraper, but the less you can afford the room for SkyScraper's own window. By default, SkyScraper keeps its window on top of the stack, so all parts of it are visible, even when an overlapping window is active. As a result, you lose the bottom quarter of your screen. An option exists that automatically resizes your windows to best fit the available space, but I'm not willing to sacrifice one fourth of my screen.

Consequently, you may want to disable this option so your programs can access the entire screen. Well, actually, you won't run them maximized. You'll want to keep a small sliver at the bottom of the screen free so you can get to the SkyScraper window. Doing so will require an extra click to get to the SkyScraper desktop before you can change floors or launch a program, but it's a small price to pay to allow more space for your applications. And, the other four desks on your current floor can still be accessed with a single click, if you know which one you want. (The default is set at five desks per floor, but can be configured differently to suit your needs.)

SkyScraper also gives you the option of enabling panning, which allows you to move from desk to desk and floor to floor by moving the mouse pointer off the screen in

I would bet

THAT MOST PEOPLE WITH LARGER THAN A 40MB DISK DON'T REALLY KNOW WHAT'S TAKING UP THAT SPACE.

the desired direction through the building.

You can also gain screen space by removing the button bar and accessing functions through SkyScraper's menus. Once you configure it the way you like, you won't need to use the buttons frequently anyway, so you might as well reclaim the real estate. One disadvantage of doing so, however, is the loss of the System Shutdown button, which can be pretty handy when your desk is so cluttered you can't find an open spot on which to click to access the desktop menu.

Binar Graphics has thoughtfully added a feature that allows you to change the relative size of the desktop and program-launcher sections. It is truly valuable to have the icons for your most-frequently-used applications in one place on every desk, and to be able to start them with a single click. However, the icons also take up space. You can switch to small icons, which SkyScraper has tried to make to resemble the original icon—only in a much smaller package. If your eyes are good enough, and the original icon distinct enough, you might be able to take advantage of this feature, but I found them to be too fuzzy to be usable.

Glee or flee

If you tend to use only one or two applications, you probably don't need SkyScraper. If you use several programs, however, you will almost definitely be more productive and find that your workday goes a little more smoothly with this handy program.

SpaceMap 1.1

Life in the 1990s is a quest for control. We listen to books on cassette to take control of the time lost in traffic—half the time, they're self-help books that instruct us to take control of our weight, our smoking, or our motivation. One of the most disparaging ways to describe someone is as "out of control." Why then, do so few of us have control over our own disk drives?

I would bet that most people with larger than a 40MB disk don't really know what's taking up that space. You probably have at least one program on your disk that you don't use, and dozens of text files that you haven't read in at least six months. If that isn't bad enough, consider the poor LAN Administrator trying to manage a couple of gigabytes of storage!

Discovering missing space

Let's examine the problem of managing your disk with the **dir** command. If you list the directory of your disk, you will see the size of the files in the current directory, but even though the names of the subdirectories are shown, you have no idea how much space those directories take up. (The same is true if you look at the Details View of your Drive object.) And, the file sizes displayed by **dir** show only the amount of data in the file—which is almost always less than the space actually used by that file. Files are allocated by sector, and usually some amount of empty space exists in the last sector of a file. In other words, if you create a



CONFERENCE & EXHIBITION

CONFERENCE PROCEEDINGS

Containing over 500 pages of course material, overviews and case studies from all the conference sessions, the First Annual OS/2 World Conference Proceedings can be used as a powerful educational tool that should be a part of every OS/2 user's library.

Call Marcia Gulino at (415) 905-2354 for more information or to place an order. Or make checks to OS/2 World Conference and send to: OS/2 Proceedings, OS/2 World Conference, 600 Harrison Street, San Francisco, CA, 94107.

All orders must be pre-paid by check or credit card. The cost of \$195 includes sales tax and first class postage.

Reader Service No. 11

32-Bit Editing Power!

Tritus SPF™

The OS/2 Text Editor that Brings the Power of the Mainframe to the PC!

Compatibility. Tritus SPF emulates ISPF/PDF including modifiable panels and keyboards. Plus, it supports many additional features such as Undo/Redo and highlighting. Tritus SPF is available for OS/2, DOS, and now for UNIX (IBM's AIX on RS/6000 machines).

REXX Macros. Write your own edit primary commands utilizing IBM's REXX in OS/2 or AIX and Tritus REXX in DOS. Tritus REXX and our ISREDIT superset of over 95 commands is included with the package. A REXX language book is optional.

Great Deal. Tritus SPF is only \$125 which includes the DOS and OS/2 versions. Call for AIX pricing. Our sales Department can be reached toll-free at **1-800-321-2100**.

TRITUS

6034 W. Courtyard Drive, Suite 120
Austin, Texas 78730-5014 USA
(512) 794-5800, Fax (512) 794-3833

Reader Service No. 12

CPU Monitor Plus

Call Today!

- Display real-time CPU and RAM utilization data for any process and thread.
 - Monitor all disk, COM port and interrupt activity.
 - Detect and stop hidden, invisible and runaway programs.
 - Show virtual memory, swapfile and paging activity.
 - Improve Performance! Start, stop and suspend programs. Monitor and set execution priorities.
- and Much More!**

BonAmi Software Corporation 508.371.1997
60 Thoreau Street, Suite 219 • Concord MA 01742
FAX: 508.371.2333

Reader Service No. 13

Get the Connection!

- ⚡ CompuServe® gives you access to the world's largest personal information and communication service.
- ⚡ OS/2® gives you an operating system with unequalled versatility and reliability.

Reap the rewards of what these two can do together with Golden CommPass®, the only OS/2 software to fully automate your on-line sessions with CompuServe forums, libraries, weather and mail.



CompuServe links you to the vast and exciting realm of on-line communication.

Golden CommPass guides you through with unprecedented ease and productivity.

Golden CommPass®



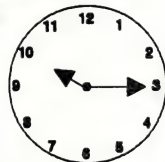
Creative Systems Programming Corp.
(609) 234-1500 Fax (609) 234-1920
Internet: 71511.151@CompuServe.com

Reader Service No. 14

Take control of your OS/2 scheduling needs with Advanced Task Scheduler for OS/2

September				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

ATS Version 3.0



Are you looking for a way to manage your production job streams? Do you have programs that need to run after the completion of one or more other programs? Do you want to run programs on a regular basis? Do you want to process files that have just been received from another system or modified locally? Do you need to take action if a file is missing? Do you need to schedule around holidays and periods of heavy CPU load?

With ATS you can run your programs when YOU want them to run with out you having to be there.

Here are some of the features of ATS for OS/2:

- * Manage Production Job Streams
- * Programs can be scheduled to run anytime.
- * Programs can be dependent upon Files, Other Programs, Holiday Schedules, and External Signals
- * Integrated Operators Console
- * Logging - To File and Console

New Features:

- * Job Queues - for managing your resources while managing your tasks
- * Periodic Scheduling
- * COMPLETE API and Command Line Interface

Upgrades Available
from Version 2 and
other Task Schedulers
Call or E-Mail for Details

MHR

Software and Consulting
2227 U.S. Highway #1 * Suite 146
North Brunswick, NJ 08902

Voice: (908) 821-0359 * Fax: (908) 821-0350 * CompuServe 70312,627

Only
\$349

file that contains only one character, **dir** will show that the file takes up one byte. But, the rules of file systems are such that the file takes up a full sector. On a large File Allocation Table (FAT) partition, that single byte actually uses a full 8,192-byte sector.

I am presenting an extreme example, but on average the amount of space wasted in the last sector of a file is about half the sector size. So, on a large FAT partition with 4,000 files (not an unusual size at all), the wasted space, which you would never see in a directory listing, might take up approximately 16MB of your disk! SpaceMap shows you the amount of space reserved for the file—whether that space is being used or not. Wasted space, by the way, is one of the strongest arguments for keeping FAT partitions smaller, and for using the High Performance File System (HPFS) for large partitions. HPFS wastes much less space.

By default, SpaceMap first scans your OS/2 boot disk and displays those directories, sorted so the largest directories are at the top of the list. The display indicates the amount of space used, not only by files in that directory, but by files in any lower-level directories. In other words, when you see the size of the \os2 directory, you are also seeing the contents of its subdirectories containing support for other things, such as DOS and Windows applications.

SpaceMap uses a different icon to show directories that have lower-level directories so you can see the visual hierarchy. Double-clicking on a directory creates a scan that shows its subdirectories sorted by size. This feature makes it a nearly trivial effort to discover where your disk space is being used.

Other ways to look at your disk

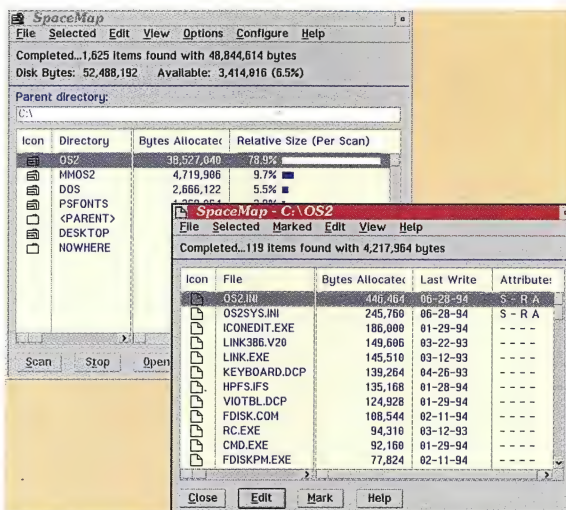
It's just as important, of course, to discover where your disk space is

being abused. SpaceMap allows you to search based on certain factors, such as the last time a file was accessed. If your attic and garage are full of junk you'll never use again, chances are your disk is too. You may be amazed at the number of files on your disk that you haven't touched in six months or more. Archive them and get them out of the way. You can still hoard them on backup if it makes you feel more secure.

Many different criteria can be used to filter your scan, in addition to dates and attributes. The output of those scans can be saved to a file for processing by another program. Sets of search criteria can be saved by name to simplify customized scans in the future. I'd like to see Capstone put these abilities together by adding a command-line switch that would let you perform a scan using the saved criteria specified in the switch, and then exit. That command could then be embedded in a REXX program to execute a scan and parse an act on the output—perhaps to automatically call an archive program against the results.

Fixing the problems you find

You can do a lot with the files found as a result of your scan. **Move, copy, delete, and edit** functions are available from the SpaceMap menus. The ability to immediately reclaim the disk space of deleted files is a nice addition. If you have activated the **deldir** command in your *config.sys* file, deleted files are actually moved to a hidden directory so they can later be undeleted, if desired. SpaceMap allows you to do a full **delete**, so the space for those files will be immediately available for new data, instead of just being hidden.



You knew there would be a "but"

Scans of extremely large partitions with thousands of files can take many seconds. Dedicated OS/2 users want to take advantage of that time to work on something else. While SpaceMap continues to run just fine in the background, it grabs the focus back as soon as the scan is complete. The last few characters you thought you were typing into your word processor get processed by SpaceMap. The user should always be in control of which application has the focus, and this type of rude behavior must be abolished.

In addition, when you are trying to mark multiple files, it would certainly be nice to use standard techniques. Unfortunately, using <Shift+Mouse-button one> to mark a range, and <Ctrl+Mouse-button one> to mark multiple individual files doesn't work. You have to click on a file, click on the Mark push-button, click on the next file, and so on. This non-standard technique can become annoying.

The documentation can only be found on-line—a growing trend. If vendors follow this trend, they must provide a detailed index, in addition to a table of contents. SpaceMap has no index, making it difficult to find the specific information you need.

Glee or Flee

SpaceMap isn't the kind of program you will run daily, or even weekly unless you're a LAN administrator, but that doesn't mean it isn't useful. SpaceMap is at its best when it surprises you. When you find out that a directory is twice as big as you expected, when you archive and realize you don't miss the files you haven't touched in months, and when you find a way to install that new application you didn't think you had enough space for,

you will certainly be glad you had a tool to let you regain control of your disk.

Resources:

SkyScraper 1.0 (\$99)

Binar Graphics Inc.
30 Mitchell Blvd.
San Rafael, CA 94903-2034
(800) 228-0666
(415) 491-4182
fax (415) 491-1164
CompuServe 73232,342
READER SERVICE NO. 151

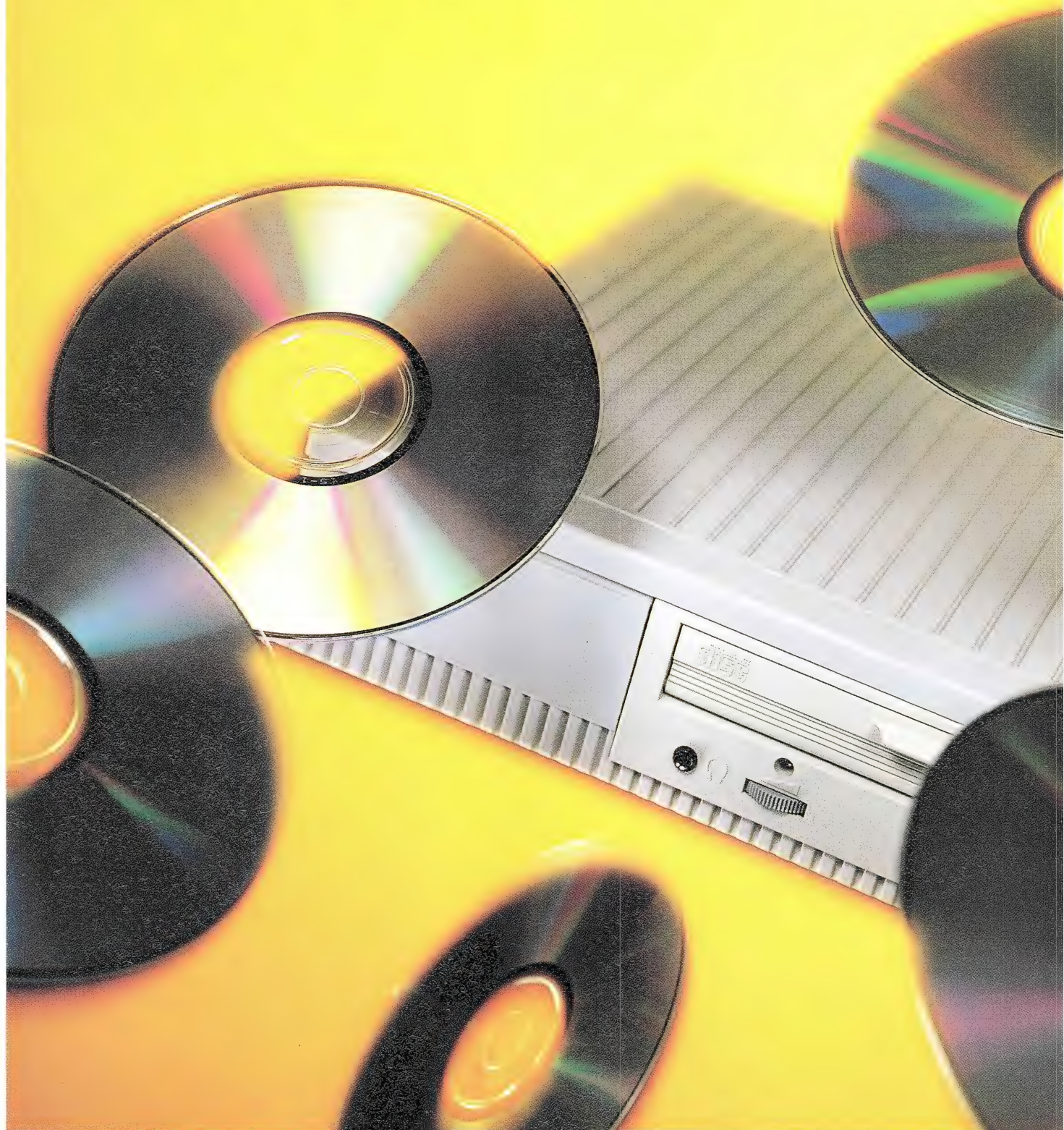
SpaceMap 1.1 (\$59.95)

Capstone Software Inc.
P.O. Box 416
Carmel, IN 46032
(800) 500-2244
(317) 848-2414
fax (317) 848-2451
CompuServe 72361,3063
READER SERVICE NO. 152

Brian Proffitt has been in the computing industry for 20 years. He was part of IBM's OS/2 team, left IBM to become the director of PC Week's Corporate Labs, and is now the president of Visionary Research. Brian is the author of two books on OS/2, is a contributing editor for OS/2 Developer and OS/2 Magazine. He can be reached on CompuServe at 75300,1466, or Internet 75300.1466@compuserve.com.

Making sense of the CD-ROM Revolution

BY GUY WRIGHT





Roll-your-own CD-ROM

So you have a few hundred megabytes of files. You know that CD-ROM discs hold hundreds of megabytes (654.7 MB to be precise). You think that CD-ROM might be a good way for you to store or transfer your few hundred megabytes, gigabytes, or terabytes—but how do you get the data onto a disc? Someone must know how to do it but you don't even know where to begin. Consider this article a crash course in do-it-yourself CD-ROM production.

Do you really want a CD-ROM?

Before launching into any CD-ROM project, you should consider the pros and cons. Everyone knows that CD-ROMs can hold a great deal of data, which is their primary advantage over other media. They are also relatively durable compared to magnetic disks. Magnetic fields won't erase them, so you don't have to worry about a user or faulty equipment accidentally erasing or overwriting data and, with a little care, the discs should last for dozens of years.

How time-critical

IS YOUR DATA? IF YOU ARE GOING TO BE UPDATING THE DATA EVERY FEW DAYS OR EVEN WEEKS AND ONLY NEED A HANDFUL OF DISCS EACH TIME, THEN A CD-ROM MAY NOT BE PRACTICAL.

Another advantage to CD-ROMs is that, once you have the data on disc, it can be accessed by just about any computer equipped with a low-cost CD-ROM drive.

On the flip side, CD-ROM drives are slow—about 10 times slower than hard-disk drives. It may not mean much, depending on your application, but when you start getting into things like video, audio, or other multimedia elements, speed can become a factor. Another disadvantage is that CD-ROMs are read-only, which means that if you want to update the information, you must make an entirely new disc. If your data is dynamic and time critical, then CD-ROMs may not be the answer for you. A few things about the CD-ROM technology may have an impact on your decision whether to use it to store your data. For example, the ISO 9660 format (used by nearly every CD-ROM) adheres to the old 8.3 file-naming convention (eight characters for the name, a period, and a three-character extension), which means that file names in the HPFS format will have to be converted to FAT-style naming conventions.

Finally, CD-ROM production will undoubtedly consume time and resources. You will probably have to purchase special hardware and software and then have someone trained in its use. While the learning curve is not steep, don't count on everything going smoothly the first time through and, as with any new software project, it will take a fair amount of

time to work out all the bugs.

Is CD-ROM right for you?

First, how much data do you have? If you only have a few hundred megabytes of data that you don't have to distribute too widely, then you might be better off with a tape backup system, magneto-optical, or removable magnetic media solutions. But if you need to distribute your information to co-workers or are thinking about the commercial aspects of producing your own CD-ROM, the technology offers some handsome benefits.

How time-critical is your data? If you are going to be updating the data every few days or even weeks and only need a handful of discs each time, then a CD-ROM may not be practical. If you need to distribute new data to a few hundred sites or more, then CD-ROM might be a viable solution, even if you have to update every week.

If you are thinking about producing only two or three copies of your data once a year, you will be paying top dollar for those three discs, but you probably don't need to go into full-scale production. In this case, you should probably contract with an outside company that specializes in CD-ROM production. You can also contact companies that duplicate CD-ROM discs and get prices for CDRs (Compact Disc Recordable) or one-offs. Many CD-ROM duplication houses offer a full line of services. You send them your data and they send you back a disc. CDRs cost from \$150 to \$350 each plus any premaster-

ing costs at \$20 to \$200 per hour. Also, keep in mind that most of these CD-ROM manufacturers aren't making much money on these one-offs; they are really looking for a subsequent duplication order.

If you are thinking about having 10 or more discs made, you might consider going through the full mastering phase and duplication. Mastering will cost you anywhere from nothing up to \$1,500 depending on how many copies you intend to have made. At quantities of 10,000 or higher most CD-ROM manufacturers waive mastering fees, but you should phone around to get the best current prices. Even if you only intend to have 20 copies made, consider that, once the master is made, duplication costs can range from \$1.80 each down to \$0.80 each (depending on the quantity). So, \$1,000 for mastering plus 20 copies times \$1.50 comes to \$1,030, versus 20 CDR discs times \$200 comes to \$4,000—plus a few hundred dollars either way for formatting and pre-mastering.

Yet another option is available for people who will want to duplicate a limited number of copies on a regular basis: purchasing your own CDR drive and making your own discs. The drives cost from \$3,500 to over \$10,000 but, from then on, each disc costs only about \$20 (plus the software to run the drives and someone to operate them).

CD-ROM A-B-Cs

To understand the various options at your disposal, let's review the entire CD-ROM manufacturing process. For the most part, it isn't very difficult to create a CD-ROM, compared to the way it used to be done when the technology was first introduced. In the early days, there really weren't any standards for how information should be stored on a disc. In some cases, certain

discs would only work with certain drives. In 1985, a group of manufacturers assembled to establish a set of standards for CD-ROM, and the result of their efforts eventually became the ISO 9660 standard. While the ISO standard for CD-ROM may not be the most flexible or efficient, it provides a common ground for CD-ROM producers. ISO 9660 ensures that any disc can be read in any CD-ROM drive. (It doesn't ensure that the computer can actually do anything with the data—Macintosh computers still can't run PC software and vice versa—but the computer can read the disc.)

Essentially, ISO 9660 is a kind of disc operating system (a DOS in the original sense) and, like DOS or OS/2, this standard adheres to certain file conventions, such as the DOS's 8.3 file name restriction. ISO 9660 also only recognizes uppercase letters, numbers, and the underscore character, so you can't use any dashes, plus signs, and so on, and directory hierarchies can only go eight levels deep.

Assuming that a disc is in ISO 9660 format and your computer can use the data and CD-ROM-drive hardware, the software and firmware handles all the translation from ISO 9660 to DOS (or HFS, OS/2, or UNIX) for you. The result is that your CD-ROM drive appears to your system as a very large read-only disc drive. The end user of the disc never sees the ISO 9660 formatting and never has to worry about it. Only as a producer (or potential producer) of CD-ROMs, do you have to worry about ISO 9660. Let's take some time to look at the process.

The data and software necessary to manipulate that data are compiled and tested on a hard disk, network, or other environment, which is actually the hardest part of the whole process. You have to decide how the data is going to be presented to the end user, how they

are going to manipulate the data, what sort of instructions will have to be included, what sort of installation routines you may need, and on and on. If all you want to do is archive data files to be used by other programs that are not included on the disc, then you don't have to do much preparation. If, on the other hand, you will be sending the discs out to people with different system configurations, or your end users need to search the data or have the data presented to them



somehow, you begin to approach software development.

For example, if you had a thousand employee records in a database and you wanted to place those records on a CD-ROM disc, a number of approaches are available. First, you could just put the records on the disc in whatever format your database software uses for files. Later, you or your users could start the database software (assuming that they already have a copy on their system), and load the records from the CD-ROM in the same way that records are loaded off a hard-disk drive. Another approach is to put a copy of the database software on the disc along with the records (assuming that you wrote the database yourself or

had permission from the original manufacturer to make copies). That way, your users could load the software from the disc before loading the records. You could take this approach one step further and modify the software so that it automatically loads the records from the disc so that, when the user starts the software, it is already loaded with data. Or, you could put the records on the disc with some sort of viewer or search software (which could be a modified version of the original database software, a commercially available package, or a custom piece of software designed for this specific purpose). In this case, the user would run the viewer or search software, which would let them manipulate the records in an appropriate way. Using any of these approaches, the best rule of thumb to follow is that, if you can get everything to work off of a hard drive, it will probably work off of a CD-ROM.

Once everything has been tested on a target system and seems to work the way you want it to, then you go to the formatting stage. A number of ISO 9660 formatting software packages are available that will convert the files into an ISO 9660 image. These packages let you pick which files will end up on the disc. The formatting software then goes through each of the files, builds a directory, and performs some other actions in preparation for the next step. If you aren't going to be making a lot of discs, you can skip the formatting stage and ship your data directly to a service bureau or CD-ROM duplicator and they can do the formatting for you (and will charge you from \$50 to \$200 per hour).

At this point, your files are usually scattered all over your hard disk or network. (The formatting software only creates a list of the files, sometimes called a build file or build.) If you have your own CDR drive, the next step is burning

INDELIBLE

THE NEXT GENERATION

Guidelines OO GUI Development



by JBA International

Quickly and easily create advanced OS/2 and Windows client/server applications independent of the operating environment. Guidelines generates and manages source files necessary to build C++ GUI applications. Servers supported include the DB2 family, ODBC, SQL-based RDBMs, and over 40 more through the Q+E libraries.

JBA53 MSRP \$595.00
SAVE \$60.00
CANADA CALL

ReView™

by Solution Technology

NEW! A twain enabled document manager for OS/2, allowing the user Document Indexing, Storage and Retrieval. Instant scrolling, flexible efficient document indexing & more.
MSRP \$299.00 \$249.00
CANADA CALL

LinkRight V1.1

by Rightware, Inc.

LinkRight is a parallel and serial port file transfer utility made especially for OS/2. Multi-threaded to queue more files while others are being sent. Compatible w/ LapLink cables.
RTW95 W/O CABLES \$69.00
RTW99 W/ SERIAL & PARALLEL CABLES \$99.00

VALU Volume Additional License Usage

Would you like a 65% discount on IBM software? Price protection for two years? Hassle-free ordering of additional licenses? ... ("But wait .. there's more!")

Indelible Blue, Inc. & IBM have an offer for your business that seems too good to be true! Through the VALU program, purchasing IBM software is both convenient and highly discounted!

What is VALU?

VALU is a two-year, volume based additional license and additional license upgrade discount program available to IBM customers. Indelible Blue, Inc. acts as a fulfillment specialist for VALU customers and handles all details of order administration.

4OS2

by JP Software

4OS2 is a powerful, enhanced replacement for the CMD.EXE command shell (Includes 4DOS - replaces COMMAND.COM). Open a new world of command line computing!
JPS11 MSRP \$89.00 \$75.00
CANADA CALL



VALU ...

How does VALU work?

- Discounts based on customer's two year installation forecast - higher volume means higher discounts!
- Volumes may be aggregated within five product categories
- Price protection applies for the term of the agreement
- Discounts are based on a published discount schedule
- VALU contract qualification with a minimum forecast of 100 licenses in one product category purchased over a two-year period
- After one year, actual sales will be compared with forecast - overachievement may result in higher discounts.

Which IBM software can I buy?

- Operating systems
- Connectivity & Server Programs
- Clients & agents
- TCP/IP Products
- Upgrades for all of the above

Want all the details?

Call Indelible Blue, Inc. for your free VALU information package. We offer additional discounts and services to make VALU an even bigger value!

COMMUNICATIONS GRAPHICS PRODUCTIVITY

ORDERS:
US: 1-800-776-8284
CANADA: 1-800-672-4255



VALU
Certified
Remarketer
Call for info on VALU
program and special
corporate discounts!

THE BLUE INDUSTRIES CORPORATION OF SOFTWARE

UTILITIES NETWORKING

ChipChat Wireless Communicator

by ChipChat Cawthon

Send text messages to alpha-pagers from OS/2. "Simply write your messages and press SEND". Exciting new 32-bit OS/2 Workplace app uses SOM & Object Technology.

CAW45 MSRP \$79.00 \$59.00
CANADA CALL

Applause

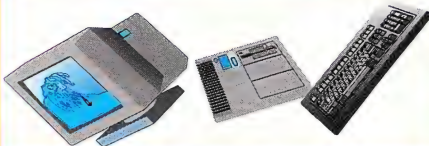


by Solution Technology, Inc.

Finally! An image viewing utility that is both fast and useful. Applause is a twain enabled image utility for OS/2 that allows a user to quickly navigate throughout the bitmap image. Applause also allows user file manipulation and conversion capability on bitmap image files. Applause provides support for both HP and Logitech scanners.

SLT25 FOR HP SCANNERS:
MSRP \$499.00 \$155.00
SLT38 FOR LOGITECH SCANNERS:
MSRP \$449.00 \$115.00

... AND NOW, THE NEXT
GENERATION OF
HARDWARE ...



You Asked For It - Now Indelible Blue Has It!

Your demand for OS/2 hardware solutions has been heard! Indelible Blue now offers our customers OS/2-compatible hardware, along with our competitive prices, and prompt, friendly service. Order your hardware and software from the same place, relax, and enjoy the peace of mind from knowing that your hardware and software are made for each other.

Why trek to the far reaches of cyberspace to find systems and solutions? We offer only industry-leading hardware peripherals to complement our software. Need more? We also have high-quality, OS/2-Certified IBM-compatible computer systems built by one of the best-regarded system manufacturers in the industry. And of course we'll preload OS/2 and your selection of software on request!

DeskMan/2™



by Development Technologies, Inc.

Manage, secure, backup and migrate your Workplace Shell environment with the essential utilities no OS/2 user should be without! With new and enhanced features for ease of use, improved performance & functionality, improved window management and more! Use DeskMan/2 to secure windows or objects, standardize corporate desktops, authorize access and much, much more. Includes the powerful VUEMan/2 virtual desktop utility.

DEV32 MSRP \$79.95 SAVE \$30.00
CANADA CALL

REXXLIB

by Quercus Systems

The most requested REXX enhancements for mathematical functions, sorting, array handling, interprocess communication, OS/2 services. No runtime fees.

QUR90
MSRP \$50.00 \$45.00
CANADA CALL

THE SINGLE SOURCE FOR OS/2

"Founded by Dedicated OS/2 Users For OS/2 Users"
Call for our new catalog - hundreds of OS/2 products!



Once you have

**A CDR WITH ALL OF
YOUR DATA AND PRO-
GRAMS ON IT, YOU GO THROUGH A TESTING PHASE.
EVEN IF EVERYTHING WORKED PERFECTLY OFF THE
HARD-DISK DRIVE, IT IS STILL IMPORTANT TO TEST
YOUR PRODUCT BEFORE GOING INTO PRODUCTION.**

a disc. The software that comes with the CDR drive uses the list generated by the formatting software and fetches the files one by one for transfer to a write-once disc. This process is usually an all-or-nothing process since everything has to be written in one session. (Note: a modified ISO 9660 standard is being proposed for multi-session discs, where writing to the CDR can be done incrementally. Currently, however, only a few CDR drives are capable of multi-session recording and not all CD-ROM drives can read the discs produced by them.)

If you don't own your own CDR, the next step is to transfer your files to some sort of removable media, such as QIC-80 tape, Exabyte, or Syquest in ISO format. You then send the tape to a CD-ROM duplicator or CDR service and have them make a CDR for you. (Note: Some CD-ROM duplicators will make you a one-off disc by going through the entire mastering process and cutting a single test disc. There is nothing wrong with this method, but they usually charge you the full mastering fee, which can be well over \$1,000. Be sure of your prices before ordering a CDR or one-off.)

Once you have a CDR with all of your data and programs on it, you go through a testing phase. Even if everything worked perfectly off the hard-disk drive, it is still important to test your product before going

into production.

If you only wanted one copy, you are finished. If you want two or three copies, then have them make a few more CDR discs. If, on the other hand you need 10 or more copies, you will have to get the disc professionally duplicated. If you had a CD-ROM duplicator make your CDR for you in the first place, all you have to do is call them up and tell them how many copies you want. If you made your own CDR or had a small service bureau make one for you, then you can send a gold disc to a duplicator, from which they will make the copies.

The CD-ROM duplicator will take your CDR or formatted data and create a glass master, from which stamps are made. These are used for pressing the discs (the process is almost identical to duplicating vinyl LP records). The mastering process usually costs between \$500 and \$1,500. Once the stamps are made, the discs are stamped, laminated, printed, packaged, and shipped anywhere you want.

Today, its practical

Other things, such as packaging, emulation, multimedia, and the thousands of varieties of discs must also be considered in your decision about whether to produce a CD-ROM. But if all you want to do is put some data onto a disc, this article should be enough to get you

started. A number of good books are available that detail the whole CD-ROM process. Many magazines are publishing articles about CD-ROM technology—from end-user publications to multimedia-developer trade journals. CD-ROM duplicators can be a very good source of information and guidance when you get to the point of jumping into the CD-ROM world. They can direct you to software vendors, data-translating services, and packaging manufacturers, as well as guiding you through the entire process. If you would rather not get your hands dirty, small CD-ROM service bureaus are springing up in most major cities and a number of companies will handle the entire process for you, from start to finish.

CD-ROM used to be an expensive and complicated technology, but things have changed quite a bit in recent years. Mastering and duplication costs have dropped dramatically, CDR drives are affordable (even for smaller companies), formatting software has entered the world of point-and-click-friendly interfaces, and CD-ROM service companies are proliferating. A few "gotchas" inherent in the technology will inevitably present themselves along the way, so don't count on things going perfectly the first time. However, these problems are not insurmountable. Where CD-ROM development used to be reserved for a few well-funded groups, it is a technology that is rapidly falling into the domain of the masses.

Guy Wright is the technical editor of OS/2 Magazine. For the past four years, he has been a CD-ROM and multimedia consultant and has produced several CD-ROM discs. He can be contacted via the Internet at gwright@mfi.com.

CD-ROM RESOURCES:

BOOKS

New Riders' Guide to CD-ROM (\$35.00)

by Dana Parker and Bob Starrett
New Riders Publishing
ISBN #1-56205-308-6
READER SERVICE NO. 153

CD-ROM: Facilitating Electronic Publishing

by Linda W. Helgerson
Van Nostrand Reinhold Computer Library
ISBN #0-442-00523-7
READER SERVICE NO. 154

Authoring Interactive Multimedia

by Arch C. Luther
AP Professional (a division of Harcourt Brace)
ISBN #0-12-460430-7
READER SERVICE NO. 155

Creating Multimedia Presentations (\$39.99)

by Douglas E. Wolfgram
ISBN# - 1-56529-667-2
QUE Publishing
READER SERVICE NO. 156

CD-ROM DUPLICATORS

Alshire International Inc.

1015 Isabel St.
Burbank, CA 91506
(213) 849-4671
READER SERVICE NO. 157

American Multimedia Inc.

2609 Tucker St.
Burlington, NC 27215
(910) 229-5554
READER SERVICE NO. 158

ASR Recording Services of California

8960 Eton Ave.

Canoga Park, CA 91304
(818) 341-1124
READER SERVICE NO. 159

AstralTech Americas Inc.

5400 Broken Sound Blvd.
Boca Raton, FL 33487
(800) 278-7258
READER SERVICE NO. 160

BQC, Inc.

2101 South 35th St.
Council Bluffs, IA 51501
(712) 328-8060
READER SERVICE NO. 161

Capitol Records (EMI)

1 Capitol Way
Jacksonville, IL 62650
(217) 245-9631
READER SERVICE NO. 162

Cinram

1600 Rich Rd.
Richmond, IN 47374
(800) 927-7749
READER SERVICE NO. 163

Denon

1380 Monticello Rd.
Madison, GA 30650
(706) 342-3425
READER SERVICE NO. 164

DMI

1120 Cosby Way
Anaheim, CA 92806
(714) 630-6700
READER SERVICE NO. 165

Evatone

4801 Ulmerton Rd.
Clearwater, FL 34622
(800) 382-8663
READER SERVICE NO. 166

HMG

15 Gilpin Ave.

Hauppauge, NY 11788
(516) 234-0200
(800) 324-3873
READER SERVICE NO. 167

JVC

2 JVC Rd.
Tuscaloosa, AL 35405
(800) 677-5518
READER SERVICE NO. 168

KAO

800 Corporate Way
Fremont, CA 94539
(510) 657-8425
READER SERVICE NO. 169

Metatec Corp.

7001 Metatech Blvd.
Dublin, OH 43017
(614) 761-2000
READER SERVICE NO. 170

Nimbus

PO Box 7427
Charlottesville, VA 22906
(804) 985-1100
READER SERVICE NO. 171

Pilz Compact Disc

PO Box 220
54 Conchester Rd.
Concordville, PA 19331
(215) 459-5035
READER SERVICE NO. 172

Print NW/Six Sigma

4101 Industry Dr. East, Ste. D
Fife, WA 98424
(206) 922-0990
READER SERVICE NO. 173

Sanyo Laser Products

1767 Sheridan St.
Richmond, IN 47374
(317) 935-7574
READER SERVICE NO. 174

Sonopress USA

108 Monticello Rd.
Weaverville, NC 28787
(704) 658-2000
READER SERVICE NO. 175

Sony DADC

3181 N. Fruitridge St.
Terre Haute, IN 47804
(812) 462-8160
READER SERVICE NO. 176

Technidisc

2250 Meijer Dr.
Troy, MI 48064
(810) 435-7439
READER SERVICE NO. 177

Technicolor

3201 East Mission Oaks Blvd.
Camarillo, CA 93012
(805) 445-1122
READER SERVICE NO. 178

3M

2933 Bayview Dr.
Fremont, CA 94538
(510) 440-8161
READER SERVICE NO. 179

US Optical Disc

1 Eagle Dr.
Sanford, ME 04073-4417
(207) 324-1124
READER SERVICE NO. 180

WEA Manufacturing

3601 West Olive
Burbank, CA 91505
(818) 953-2941
READER SERVICE NO. 181

Zomax

5353 Nathan Lane
Plymouth, MN 55442
(612) 553-9300
READER SERVICE NO. 182

*If specialized titles
weren't so effective,
we wouldn't be
the world's fastest growing
high-tech publisher.*



But we are.

It's funny how things can sneak up on you. Like Miller Freeman's strong growth in high-tech magazines.

As the high-tech world has become increasingly specialized, Miller Freeman has quietly assembled an outstanding selection of titles to fit this reality. Since September 1992, we have added *Cadence*, *Dr. Dobb's Journal*, *OS/2 Developer*, *DBMS* and *Microsoft Systems Journal*. *Software Development*, *OS/2 Magazine*, *Stacks: the Network Journal* and *Game Developer* were launched in that same time frame.

We work hard to identify important markets and then deliver magazines with tight editorial focus and highly targeted audiences. This gives you access to in-depth articles and product reviews--coverage you won't find in broader magazines.

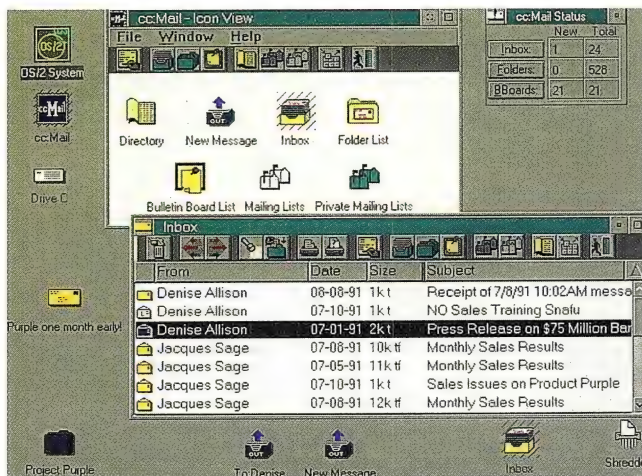
Our specialized expertise has grown to include international marketing and trade shows. Miller Freeman is one of North America's largest producers of high-tech events featuring SD East & West, OS/2 World, Autodesk University and the Computer Security Conference.

So next time you're looking for targeted high-tech information, look for a specialized magazine from Miller Freeman.

 **Miller Freeman**
A MEMBER OF THE UNITED NEWSPAPERS GROUP



What does C Set ++ offer? A superior implementation of a 32-bit ANSI C and C++ compiler, with 486 and Pentium optimizations. Although it's not considered tops in the integrated-development-environment department, C Set ++ is highly graphical, with a visual PM debugger, GUI class browser and tracer, and tool kits for multimedia applications. It also includes Kase/Set, a visual designer and code generator.



cc:Mail for OS/2 WPS 1.01

cc:Mail Inc., a division of Lotus Development Corp.

cc:Mail for OS/2 Workplace Shell is an e-mail client running on an individual OS/2 PC. The cc:Mail server does not need to be OS/2-based—but if an end-user is using OS/2, he or she will enjoy a better e-mail interface than the Windows or Macintosh cc:Mail users next door.

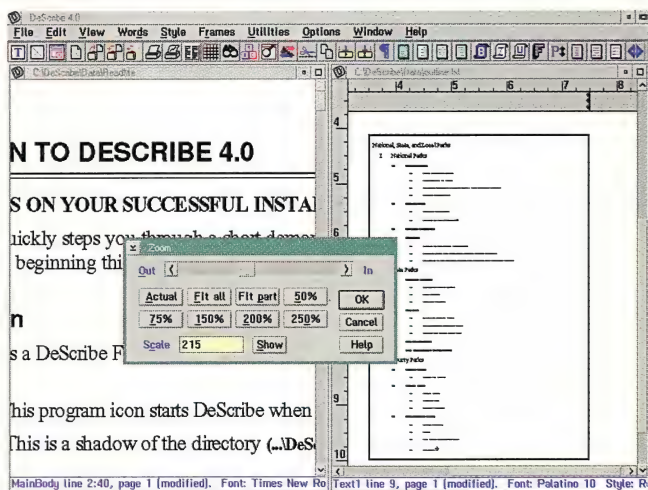
The key is WPS integration. Click the right mouse button on an OS/2 object, and one option is "cc:Mail It!" From within cc:Mail, you can drag-and-drop folders and objects onto the desktop or create new objects using standard WPS protocols. You can drag message text into a cc:Mail window. Okay, it's just an e-mail utility. But it acts like it's part of OS/2—and that's the way a utility *should* behave.

DeScribe 4.0

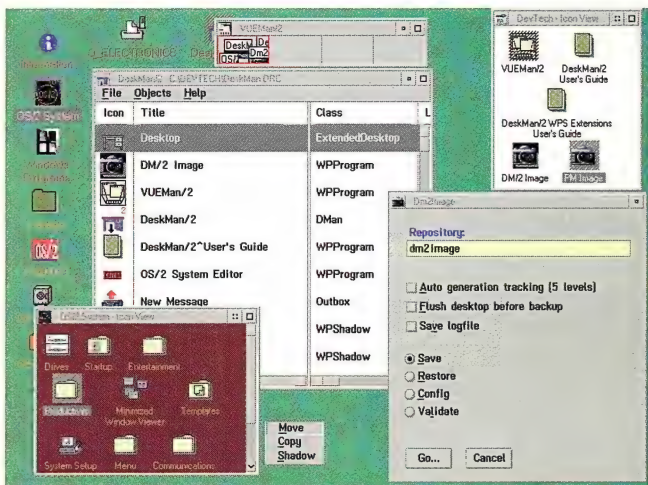
DeScribe Inc.

DeScribe is the only major word processor for OS/2 that's *only* available for OS/2. That's not why it was chosen for an *OS/2 Magazine* Editors' Choice Award, however. It's been chosen because it's the word processor that we see most often recommended by OS/2 users, largely because of its OS/2 integration.

We'll admit that DeScribe isn't the most powerful word processor that runs under OS/2; both Word for Windows 6.0 and WordPerfect 6.0a offer more Yes



check-boxes on the obligatory arcane-feature checklist. But when it comes to a word processor that looks like it *belongs* on the OS/2 desktop, DeScribe has won the hearts of OS/2 users. DeScribe was reviewed in *OS/2 Magazine*, March 1994, p. 54.

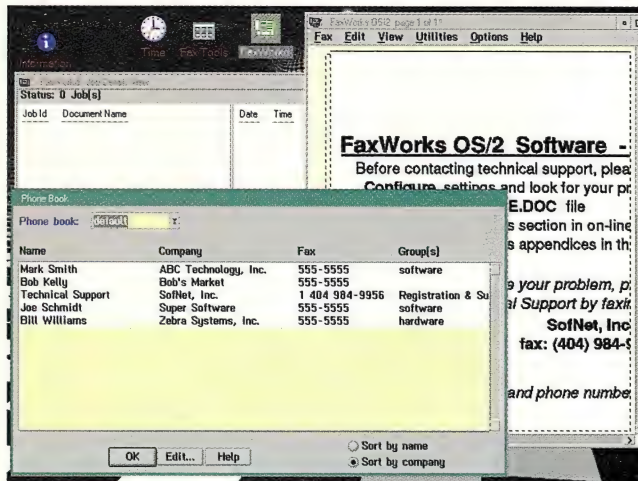


DeskMan/2 1.5

Development Technologies

DeskMan/2 is a Workplace Shell (WPS) enhancement utility that offers additional functionality, security, and more. It's rapidly become one of the most well-known and popular OS/2 add-ons.

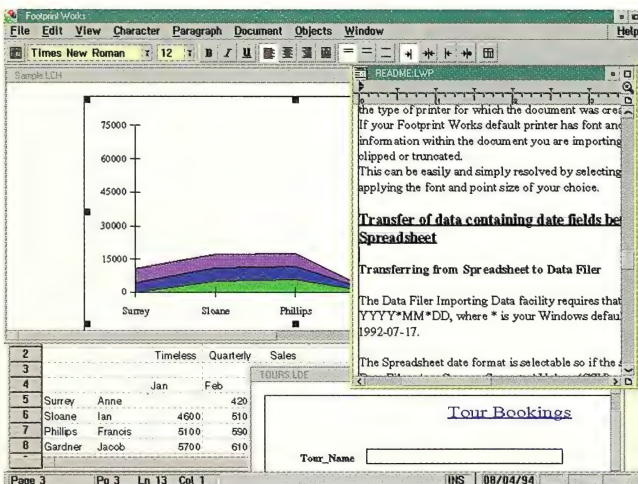
DeskMan/2 backs up and restores the configuration of the WPS desktop and lets users share WPS objects across the network—it's ideal for MISs wanting to maintain a certain desktop configuration as a company standard. You can use DeskMan/2 to shred normally unshreddable objects or protect objects from deletion. No tools available today add this level of WPS functionality to OS/2. DeskMan/2 was reviewed in *OS/2 Magazine*, April 1994, p. 51.



FaxWorks 1.3 for OS/2 SofNet Inc.

FaxWorks for OS/2 is one of several fax utilities for OS/2. It's the one we've found most recommended by our readers and experts. It offers easy "just print to the fax printer" use from OS/2, Windows, and DOS applications, plus a pretty impressive array of features, including gray-scale faxing and faxing customized documents through "mail-merge." Its "all-in-one" fax-management software includes a fax viewing and mark-up tool, fax scheduler, and other utilities.

FaxWorks is also compatible with an impressive array of fax modems, including Intel's Satisfaxion. FaxWorks for OS/2 was reviewed in *OS/2 Magazine*, February 1994, p. 59.



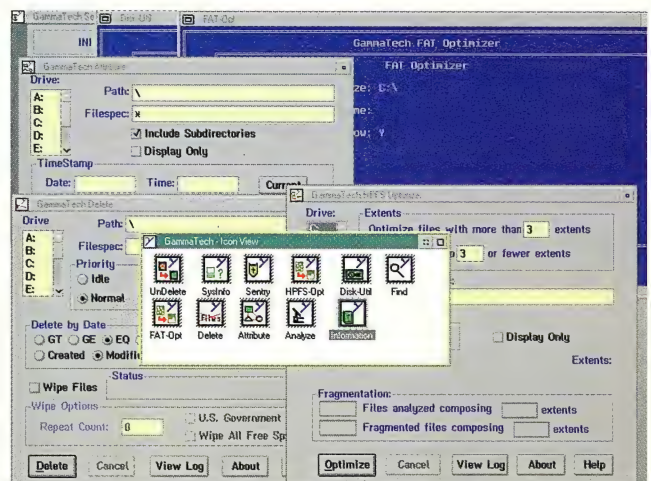
Footprint Works 1.0 Footprint Software Inc.

Footprint Works is obviously a "works" package—"works" having become synonymous lately for a low-cost integrated applications package offering word processor, spreadsheet, charting tools, report writers,

and a database.

True, the individual components of Footprint Works don't have the long list of power-user features found in stand-alone word processors such as WordPerfect or Ami Pro, or spreadsheets like Excel or 1-2-3. But here's what you *do* get: The set of features you use every day, at a great price. Footprint Works is priced at \$149, whereas an industrial-strength word processor alone costs \$495.

You also benefit from OS/2 integration, consistent look-and-feel across application components, and reliability. Footprint Works is ideal for people who bought their computers to get work done quickly and easily. Footprint Works was reviewed in *OS/2 Magazine*, March 1994, p. 15.



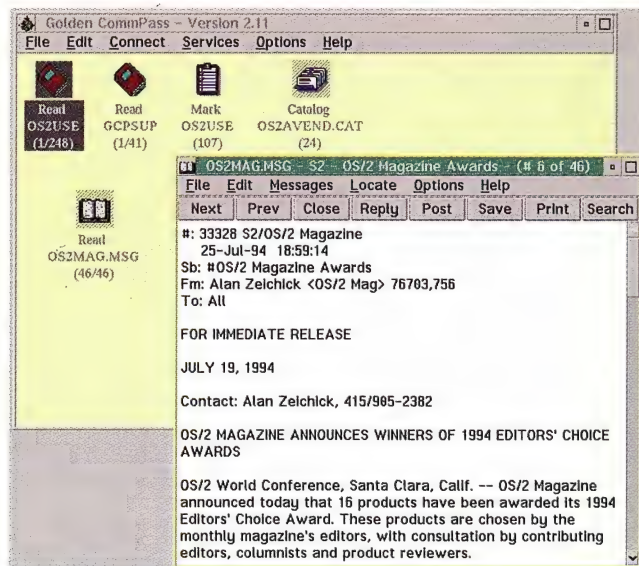
GammaTech Utilities 2.1 SofTouch Systems Inc.

The GammaTech Utilities are to OS/2 what PCTools and Norton Utilities are to DOS and Windows: a set of "must-have" disk- and file-manipulation tools that many OS/2 power users couldn't live without.

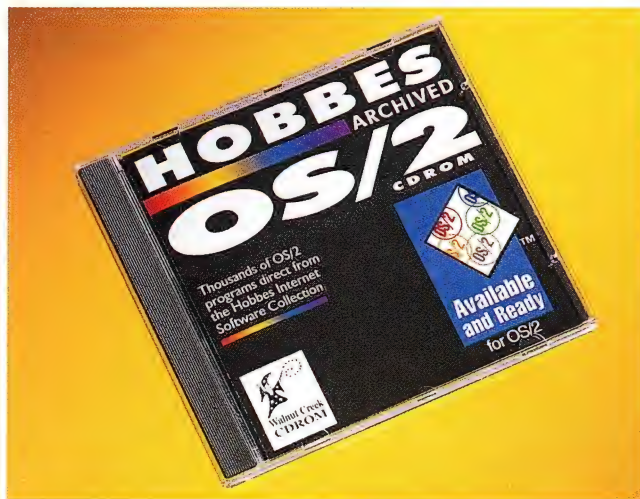
You've got your data backup. You've got your file-recovery. You've got your disk optimizer. You've got your systems analysis. You've got your virus detection. You've got your boot-sector backup and restore. You've got your .ini file protection. And, most importantly, you've got HPFS compatibility, not just FAT. In all, it offers 21 separate utilities that keep an OS/2 PC humming. The GammaTech Utilities were reviewed in *OS/2 Magazine*, April 1994, p. 50.

Golden CommPass 2.11 Creative Systems Programming Corp.

Golden CommPass is for CompuServe users only. It's a communications tool that makes one of the most popular hangouts for OS/2 users faster, more efficient, and less expensive.



you're a CompuServe customer, this tool will save you time and money. Golden CommPass was reviewed in *OS/2 Magazine*, February 1994, p. 24.



Hobbes CD-ROM, August 1994
Walnut Creek CD-ROM

The Hobbes CD-ROM makes us wonder, "Who needs a modem?" If you're searching for device drivers, shareware utilities, bitmapped images, PostScript fonts, or

32-BIT SALE

ON LATEST OS/2 APPLICATIONS

This is a Limited Time Offer!
Give Us a Call!

Orders: 800-804-8588
FAX: 310-804-6154

(CATALOG available)

OS+ RESOURCE
For Leading Edge Software

10140 Artesia Place, Ste. C
Bellflower, CA 90706

Development Tools

Productivity Software

Communication & Networking

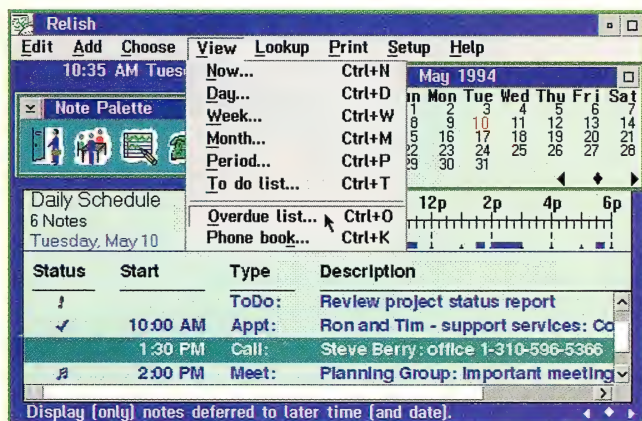
Backup Software

Graphics & CAD

Utility Software

games, you'll find not dozens, not hundreds, but actually about 3,450 files on the Hobbes CD-ROM. For the low price of admission, you can save money if you copy a few of these files from the CD-ROM rather than paying to download them from a commercial on-line service, or making long-distance calls to OS/2-specific bulletin boards.

Since the disc is only updated every three or four months, it may not contain the absolute latest version of a driver or shareware program. Still, if you're looking for OS/2 tools, you need this disc. The Hobbes CD-ROM was reviewed in *OS/2 Magazine*, April 1994, p. 21.



Relish 2.12

Sundial Systems Corp.

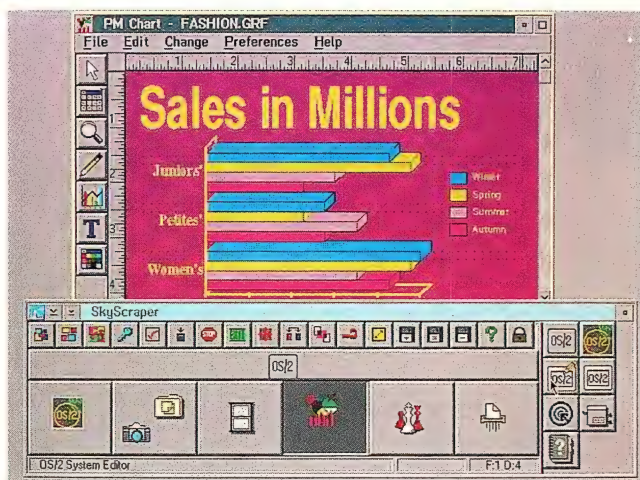
Relish is a personal time-management program designed to help individuals keep track of their appointments, to-do lists, scheduled phone calls, and more. It's an ideal tool if you're able to work with a time-management program (and not everyone is). The payback is that, if you can use a computer to manage your time, Relish's phone book, calendar reports, and automatic notifications can keep you well-connected and well-organized.

OS/2 users like Relish's Workplace Shell integration, complete with drag-and-drop functionality. They've found it useful for coordinating many time-critical events, on individual desktops and through a network. Relish was reviewed in *OS/2 Magazine*, December 1993, p. 64.

SkyScraper 1.0

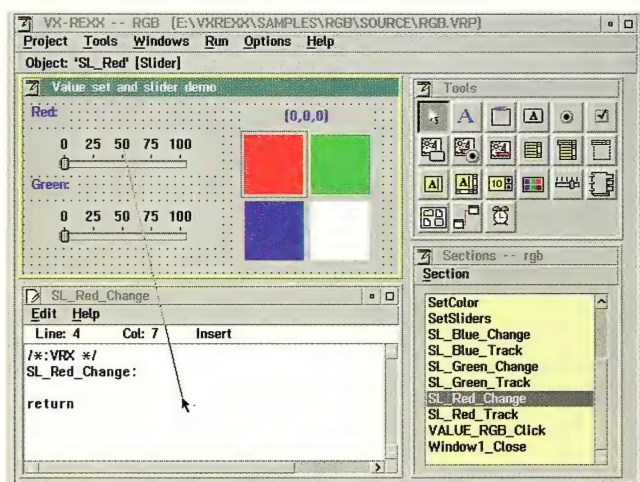
Binar Graphics Inc.

SkyScraper is best described as a "desktop manager" for OS/2. The main benefit of SkyScraper is that, rather than working on one 14-, 17-, or 21-inch screen, you now have access to several virtual desktops. By pressing a SkyScraper button, you can switch from desktop to desktop—letting you leave application windows maximized, while not making it difficult to switch



between applications (or collections of applications).

Other SkyScraper benefits let you quickly launch applications with either a button push or drag-and-drop; you can even stretch a single application's window across several virtual desktops, a handy tool for graphics or spreadsheet programs, where scrolling is often slow or inconvenient. Capsule summary: SkyScraper lets you exploit the Workplace Shell the way you want to. SkyScraper is reviewed on p. 17 of this issue.



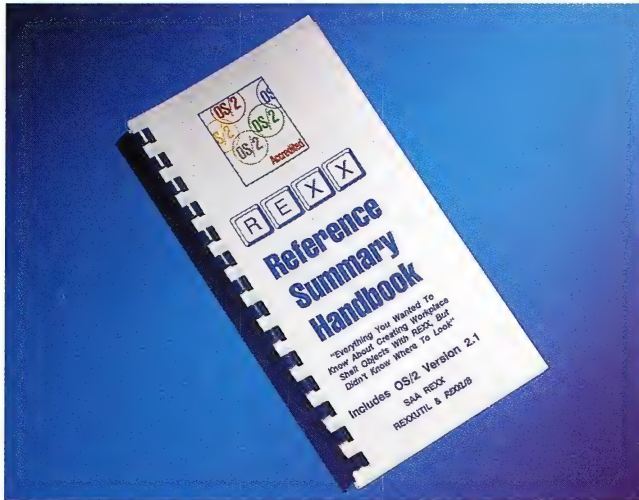
VX-REXX 2.0

Watcom International

VX-REXX is one of several products that offer graphical REXX programming power—something lacking in the REXX interpreter included with OS/2 2.x. VX-REXX leads the pack in offering the most information about a programming project's current state, and the best accessibility to its different parts.

Think of a feature you'd want to have in a GUI REXX, and it's in VX-REXX. If you want an easy-to-use manual, tools for creating DDE clients, access to the contents of OS/2's .ini files, or keystroke emulation, here it is. VX-REXX also improves upon OS/2's

REXXUTIL library. Whether you're a newcomer or an experienced programmer, you'll enjoy VX-REXX's multithreaded and SOM-compliant power, integrated development environment, and royalty-free run-time distribution. It's the graphical REXX for the masses. VX-REXX was reviewed in *OS/2 Magazine*, September 1994, p. 42.



BOOKS

REXX Reference Summary Handbook, 2nd Edition **CFS Nevada Inc.**

The *REXX Reference Summary Handbook* by Dick Goran is a slender 148-page guide to the REXX language. It's not a tutorial on REXX or on programming, and it's not filled with color pictures.

The *REXX Reference Summary Handbook* is, however, the book you're most likely to refer to while programming. With clear descriptions of REXX keywords, system commands, built-in REXXUTIL and REXXLIB functions, WPS objects, DOS and WIN-OS/2 settings, and more, you're getting everything a REXX programmer needs to know, all in one handy package. Don't program without it.

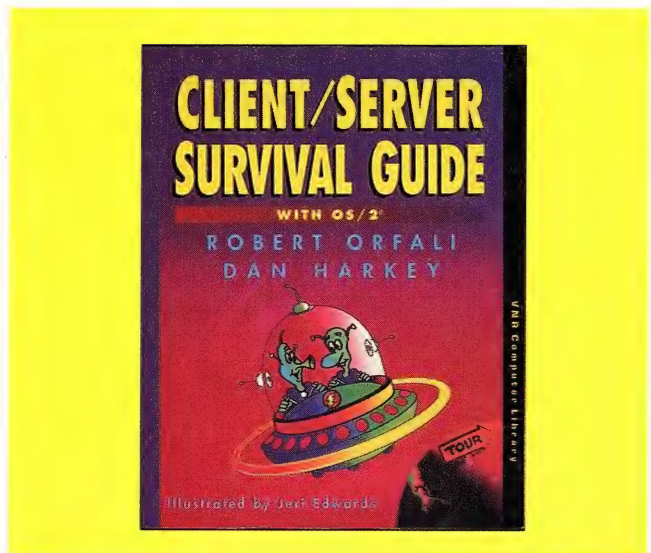
OS/2 Unleashed, 2nd Edition **Sams Publishing**

OS/2 Unleashed by David Moskowitz, David Kerr, and a host of other contributing authors is one of today's best values. For about \$40, you get 1,332 pages of useful info about installing and tuning OS/2, using and customizing the Workplace Shell, REXX programming, using VDMs and WIN-OS/2, understanding video and multimedia, fonts and printing, and oodles more. You'll learn \$40 worth of good stuff in nearly each chapter.

But wait, there's more: a bound-in CD-ROM. Granted, little on this disc is new, since it's primarily



OS/2 shareware or freeware, some REXX routines, and lots of product demos and test drives. This disc won't replace the Hobbes CD-ROM. But at the price, it makes a great book an even more valuable resource. It belongs on your desk.



Client/Server Survival Guide with OS/2 **Van Nostrand Reinhold**

The *Client/Server Survival Guide* by Robert Orfali and Dan Harkey is big. At 969 pages, you'd expect to find a lot of detail in this tome—and you'd be right. But there's more to the *Survival Guide* than facts, facts, facts; it's stuffed with non-condescending tutorials, detours down interesting side roads (like comparisons of OS/2 and NT), amusing quotations from real industry peo-

ple, "soapbox" rants about products the authors don't like, and more.

If you're looking into client/server technology for your own business, or you want to keep up with the leading-edge of mid-1990s computing, you'll find this book not only educational, but compelling. The book's biggest problem: It's hard to stop colleagues from borrowing it.

Alan Zeichick is Editor-in-Chief of OS/2 Magazine.

Sworn By, not Sworn At

The story behind *OS/2 Magazine's* Editors' Choice Awards is a simple one. One of our missions at *OS/2 Magazine* is to report about products that enhance OS/2's utility and functionality; we do so each month through new-product announcements (in "Just Announced") and hands-on evaluations (in "Test Drives" and other reviews). Once each year, we also believe that it's appropriate to point out special products that truly stand out in the OS/2 community, including:

- Products that are appropriate for use by a majority of *OS/2 Magazine's* readers.
- Products that are actually being used by many OS/2 users—in other words, products that readers have indirectly voted for by buying and using.
- Products whose users are enthusiastic, and about which we've seen clear evidence of word-of-mouth recommendations at user-group meetings or on the nets.
- Products that, upon personal evaluation by members of the *OS/2 Magazine* staff, our independent product reviewers, and contributing editors, are judged worthy of special recognition.
- Products that exploit OS/2's design goals, and demonstrate the unique advantages of using OS/2, rather than other PC operating systems.

Editors' Choice Award Winners:

4OS2 2.0 and 4DOS 5.0 (\$69 each, \$89 for both)

JP Software Inc.
(617) 646-3975, (800) 368-8777, fax (617) 646-0904
e-mail 75020.244@compuserve.com
READER SERVICE NO. 183

C Set ++ 2.1 (\$249)

IBM Corp.
(800) 342-6672
READER SERVICE NO. 184

cc:Mail for OS/2 WPS 1.01 (\$95 for single client)

Lotus Development Corp.
(415) 961-8800, (800) 448-2500
READER SERVICE NO. 185

Client/Server Survival Guide with OS/2 (\$39.95)

Van Nostrand Reinhold
(606) 282-5786, (800) 842-3636
READER SERVICE NO. 186

DeScribe 4.0 (\$495)

DeScribe Inc.
(916) 646-1111
READER SERVICE NO. 187

DeskMan/2 1.5 (\$79.95)

Development Technologies Inc.
(803) 790-9230
READER SERVICE NO. 188

FaxWorks 1.3 for OS/2 (\$149)

SofNet Inc.
(404) 984-8088, (800) 432-9967, fax (404) 984-9956
READER SERVICE NO. 189

Footprint Works 1.0 (\$149)

Footprint Software Inc.
(416) 860-0477, (800) 465-8470
READER SERVICE NO. 190

Gamma Tech Utilities 2.1 (\$149)

SoftTouch Systems Inc.
(405) 947-8080
fax (405) 632-6537
READER SERVICE NO. 191

Golden CommPass 2.11 (\$99)

Creative Systems Programming Corp.
(609) 234-1500
fax (609) 234-1920
e-mail 71511.141@compuserve.com
READER SERVICE NO. 192

Hobbes CD-ROM, August 1994 (\$29.95)

Walnut Creek CD-ROM
(510) 674-0783, (800) 674-0783
fax (510) 674-0821
READER SERVICE NO. 193

OS/2 Unleashed, 2nd Edition (\$39.95)

Sams Publishing
(800) 428-5331
fax (800) 858-7674
READER SERVICE NO. 194

Relish 2.12 (\$189)

Sundial Systems Corp.
(310) 596-5121
READER SERVICE NO. 195

REXX Reference Summary Handbook, 2nd Edition (\$19.95)

CFS Nevada Inc.
(702) 732-9616
fax (702) 732-3847
READER SERVICE NO. 196

SkyScraper 1.0 (\$99.95)

Binar Graphics Inc.
(415) 491-1565, (800) 228-0666
fax (415) 491-1164
READER SERVICE NO. 197

VX-REXX 2.0 (\$199)

Watcom International
(800) 265-4555, (519) 886-3700
fax (519) 747-4971
READER SERVICE NO. 198

OS/2 versus Advanced Graphics

How to make OS/2 work with your expensive graphics board. By Scott Vouri

When you take a new version of OS/2 out of the box and install it, it should just work, right? It seems like a no-brainer. You shouldn't have to jump through a bunch of hoops concerning obscure CD-ROM model numbers or take extra steps to get OS/2 to take advantage of your graphics hardware. However, this seemingly basic premise actually pre-supposes an extraordinary amount of advance work by hardware vendors, OS/2 developers, device-driver writers and installation-program authors. For that simple act to occur, OS/2 is going to have to recognize your hardware at installation time, figure out what its capabilities are, and load the correct device drivers for it.

This means that the supplier of each of your particular peripherals would have had to make IBM aware of their existence well prior to the release of the operating system version, obtain a driver development kit (if it even existed at that time), write and test a device driver for an unreleased (and probably buggy) operating system version (or get IBM to do it for them) and, on top of all that, work with IBM's installation-program authors to get special detection and driver-installation code for their hardware into the release. Add to this some very misguided thinking in the old days about supporting only IBM hardware and you begin

to understand why you can't seem to get OS/2 to support that fantastically fast graphics board you own.

However, this situation is not hopeless. Contrary to popular opinion, all of the industry segments I've just listed have been working to delete "easy installation" from the list of oxymorons. OS/2 actually supports quite a few graphics chips and boards. (See the sidebar on this page).

In fact, the original release of OS/2 2.1 supported most non-accelerated graphics boards based on the Tseng Labs, Western Digital, ATI, Video 7, and Trident Super VGA chipsets all the way up to 1,024 x 768 x 256 mode, as well as XGA (at 256 and 64K colors), 8514/A, and standard VGA.

Even more importantly, OS/2 for Windows and the OS/2 2.1 Service Pak finally brought OS/2 into the world of mainstream accelerated graphics by including 256, 64K, and 16.7-million-color drivers for adapters based on S3 chip sets.

OS/2 Graphics Chip Support Timeline

March, 1992: IBM releases OS/2 2.0. It has a 32-bit kernel, but the graphics engine and all display drivers are still 16-bit. Only IBM display adapters are supported.

September, 1992: IBM releases the OS/2 2.0 Service Pak. It contains the first version of the 32-bit graphics engine along with 32-bit display drivers for VGA, XGA, and Super VGA. It also has the first "seamless" Windows support—but only in XGA.

March, 1993: IBM releases OS/2 2.1. It supports XGA, 8514/A, Super VGA, and VGA. The drivers are all 32-bit, more robust, and all support "seamless" Windows.

June, 1993: IBM puts accelerated S3 256-color display drivers on CompuServe.

November, 1993: IBM releases OS/2 for Windows. It contains the 256-color S3 drivers but the installation is buggy. The other pre-existing drivers are updated with many bug fixes.

February, 1994: IBM releases the OS/2 2.1 Service Pak. It contains S3 display drivers for 256 colors up to 1,280 x 1,024; 64K colors up to 800 x 600; and 16.7 million colors at 640 x 480.

April, 1994: IBM releases the OS/2 for Windows Service Pak. It contains the full set of S3 display drivers.

The OS/2 INSTALL bugaboo

If OS/2 2.1 supports so many chip sets, why is it that all I get is 640 x 480 x 16 colors? Believe it or not, the OS/2 installation program *forces* you into that mode. Even though the installation program detects and asks you to confirm the fact that you have a Super VGA board, it still goes ahead and installs the standard VGA display driver! IBM offi-

If you have an **ACCELERATED GRAPHICS BOARD**

BASED ON AN S3 CHIPSET, YOU CAN USE THE S3 DRIVERS INCLUDED WITH OS/2 FOR WINDOWS.

cials say it was done intentionally to guarantee that OS/2 would boot correctly the first time you installed it, even if the wrong type of graphics chip was detected. This approach sounds pretty safe, but it's puzzling that you are not informed of this oddity, nor are you given the opportunity to force Super VGA installation if you want to. Fortunately, you can install the right drivers for your board, *once you have OS/2 running*. Here's how:

- From the OS/2 desktop, open the OS/2 System folder.
- From inside the OS/2 System folder, open the Command Prompts folder.
- From inside the Command Prompts folder, open an OS/2 Window.
- At the OS/2 command prompt type DSPINSTL and press <Enter>.
- A Display Driver Install window will come up. Check the box labeled Primary Display and then press OK. (I know it may already say Super Video Graphics Array, but trust me, these are the steps.)
- A new menu titled Primary Display Adapter Type will come up. If OS/2 2.1 supports your graphics adapter, the proper driver will already be selected. Press OK to confirm this selection.
- Next, you will get a screen entitled Monitor Configuration/Selection Utility. The purpose of this box is for you to tell OS/2 about any special DOS utility that must be run for your graphics adapter to work at the correct refresh rate. This feature requires

that you have such a utility from your graphics board manufacturer and you know exactly how it needs to be invoked. For now, we will use the default. If you are interested in this option, see the OS/2 2.1 Installation Guide (p. 115). Select OK.

- The screen will go blank momentarily while OS/2 attempts to detect your graphics hardware. Then, a dialog box titled Select Display Resolution will appear. You will be given a choice of resolutions that are available for your board. Select the resolution that you desire (within your board's memory-size constraints) and select OK.

Where to find drivers

If the graphics drivers you need aren't included with OS/2 or available on an OS/2 bulletin board, here's what you can do:

- Dial your graphics-board supplier's BBS and download them. If you don't know the BBS number, call their general switchboard and ask the receptionist. Most graphics-board makers operate a BBS. (See "Information Center," by Dick Conklin, *OS/2 Magazine*, Sept. 1994, pp. 59-62.)
- Check the CompuServe Graphics Support Forums (GO GRAAVEN, GRABVEN, or GRACVEN). Most graphics-board makers have their own forums in this area and maintain an extensive library of display drivers.
- Call your graphics-adapter manufacturer and ask them to send you a set of OS/2 2.1 drivers.
- Check the Hobbes OS/2 CD-ROM. This extensive disc has over 3,600 files from the largest OS/2 ftp archive (<ftp://os2.cdrom.com>).

- A dialog box entitled Source Directory will come up with drive *a:* pre-selected as the desired drive. Press INSTALL.
- Insert the various disks from your OS/2 installation set as prompted.
- After acknowledging the Install Complete dialog box, remove the last disk from drive *a:*, exit from the OS/2 Window, shutdown OS/2, and restart your system.
- When OS/2 reboots, you will be in the resolution you selected!

These instructions work for OS/2 2.1 and all newer versions, but only for non-accelerated Super VGA boards. If you have an accelerated graphics board based on an S3 chipset, you can use the S3 drivers included with OS/2 for Windows. If you're using an older OS/2 version, you can download IBM's S3 display drivers or the appropriate Service Pak from CompuServe under the OS2SUP forum libraries. You can also order the Service Pak disks directly from IBM. (The Service Paks also contain many enhancements in addition to graphics, so they are worth obtaining.)

Disaster recovery

Just in case the installation of a high-resolution display driver for your graphics board goes awry, and you somehow end up looking at a blank screen instead of the Workplace Shell, IBM has provided a back-door method for you to return your system to plain vanilla VGA mode. To access it, take the following steps:

- Locate your set of OS/2 2.1 installation disks.
- Boot your system from the first disk (Install) and insert the second disk (Disk 1) when prompted.
- When the Welcome screen from Disk 1 is displayed, press <Esc> instead of <Enter>. This will take

you out to an OS/2 command prompt.

- Change to the \os2 directory on the drive where OS/2 2.1 is installed.
- Enter SETVGA [drive:] at the command prompt. (Replace [drive:] with the designator of the drive where OS/2 2.1 is located.) For example, most people will type SETVGA C:
- Enter the appropriate display-driver disks from your OS/2 2.1 installation set when prompted.
- When SETVGA completes its task, remove the last disk from Drive a: and reboot your computer. OS/2 will load in standard VGA mode.

Adding your own drivers

What if OS/2 2.1 doesn't support your display adapter? Fortunately, IBM has provided some hooks that allow graphics adapter suppliers to

add their own custom display drivers to DSPINSTL's native set. To run your adapter in high resolution:

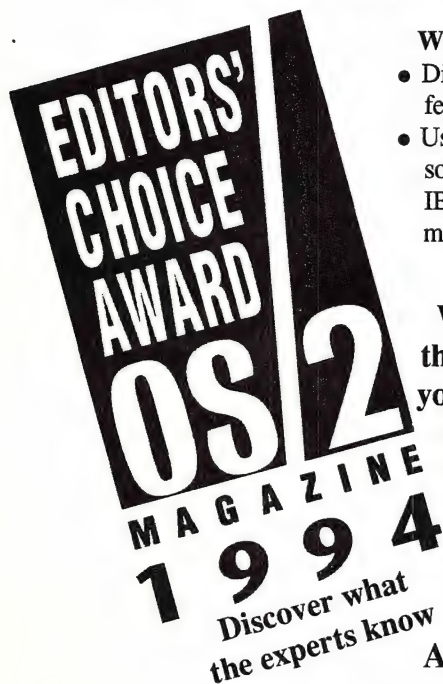
- Locate your graphics board vendor's custom OS/2 2.1 display drivers and installation utility. They should be on the disks that came in the box with your graphics board. If you cannot locate them, you have several options; see the sidebar labeled *Driver Sources*.
- Follow the instructions that come with the custom drivers and run the manufacturer's OS/2 2.1 driver-installation program. It will usually copy the appropriate drivers to your hard disk and modify DSPINSTL's menu list so that your board will be displayed when DSPINSTL is run.
- If your vendor's installation program didn't run DSPINSTL automatically for you, you will prob-

ably have to run it now, according to the vendor's instructions and the steps presented previously in this article.

If none of the alternatives mentioned here enable you to run your graphics adapter in all its glory, don't despair. First, get on the OS2USER or OS2SUP forum on CompuServe. Chances are, hundreds of other loyal OS/2 users with the same problem are out there, and one of them may have an answer. Also, make sure both IBM and your graphics-board manufacturer know about your problems. It is only by heightened customer reaction that both will decide to support OS/2.

Scott Vouri is the president and founder of Binar Graphics in San Rafael, Calif., a supplier of OS/2 drivers and utilities.

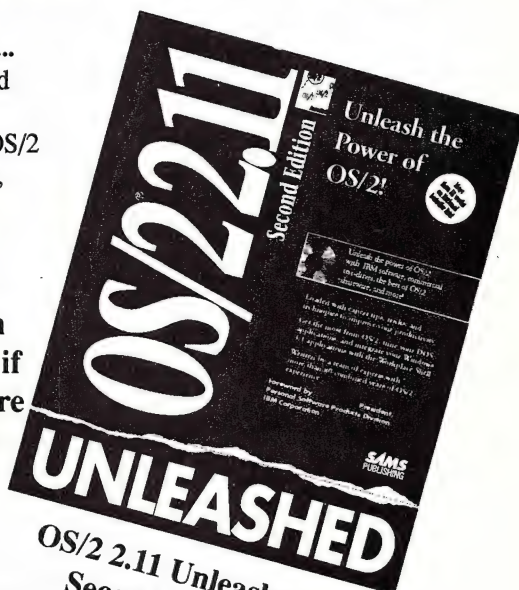
Unleash the Power of OS/2!



With OS/2 2.11 *Unleashed*, you can...

- Discover undocumented shortcuts and features you can't do without
- Use the free CD-ROM to test-drive OS/2 software, the best of OS/2 shareware, IBM Ultimedia tutorial demos, and more!

With more than 52 weeks on the National Bestseller lists – if you don't get this book, you are missing your best chance to increase OS/2 productivity!



OS/2 2.11 Unleashed,
Second Edition
0-672-30445-7 ~~\$39.95~~ \$31.96

Act now and save 20% on the preeminent book for OS/2!

1-800-428-5331

Order code: OS21

Reader Service No. 18

The Graham Utilities

Often the simplest tools are the most powerful. BY ESTHER SCHINDLER

The Graham Utilities are a collection of simple programs, each of which performs a straightforward function to manage your hard disk and your OS/2 system. The key word here is simple. Nothing here will astonish you or make your jaw drop. However, like a screwdriver, the simplest tools are often the most powerful, and the Graham Utilities are a good example of that axiom.

The installation program creates a Workplace Shell folder full of pretty icons but, like many utility packages, each of the three dozen individual programs is command-line based. As with most utility packages, that's a strength, since you're apt to need tools like DISKEDIT when you need to boot into OS/2 from disk. On the other hand, I won't object if, as the Graham Utilities mature, some of those utilities develop a graphical face.

The individual utilities can be run from the program object, the command line, or the Graham Integrator (GI). GI is a text-based application that guides you through the

We all like the days on which we can say that the program quietly goes about its business and does exactly what it claims. This is one of those happy times.

use of each utility, in a manner reminiscent of the Norton Integrator.

In fact, most of the Graham

Utilities will remind you of the Norton Utilities, circa version 3 or version 4. Even the program names are the same, or extremely similar: SI, DISKEDIT, and FA. Graham Change Directory (GCD) works just like Norton Change Directory (NCD). Depending on your opinion of the Norton Utilities of that era, you might see this similarity as a strength (its familiarity and unambiguous nature) or a weakness (if you never liked the Norton Utilities in the first place). It's your call.

If you used the Norton Utilities, many commands (and even their syntax) will be immediately familiar. You'll see old friends such as File Find (search the hard disk for a particular file), Screen Attributes

(change the text color in an OS/2 VIO window), DISKEDIT (edit the hard disk directly), and Nullfile (wipe file data so that it cannot be retrieved). It also contains several UNIX-related tools, including those essential text-conversion utilities, *uuen-code*, and *uude-code*. All of the utilities are fully HPFS-aware.

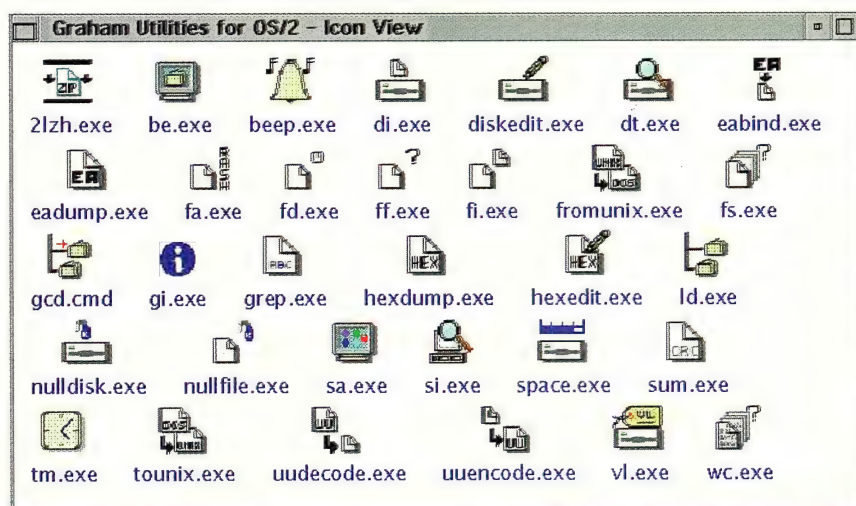


Figure 1: The Graham Utilities provide a few dozen separate programs to help you manage your hard disk and your OS/2 system.

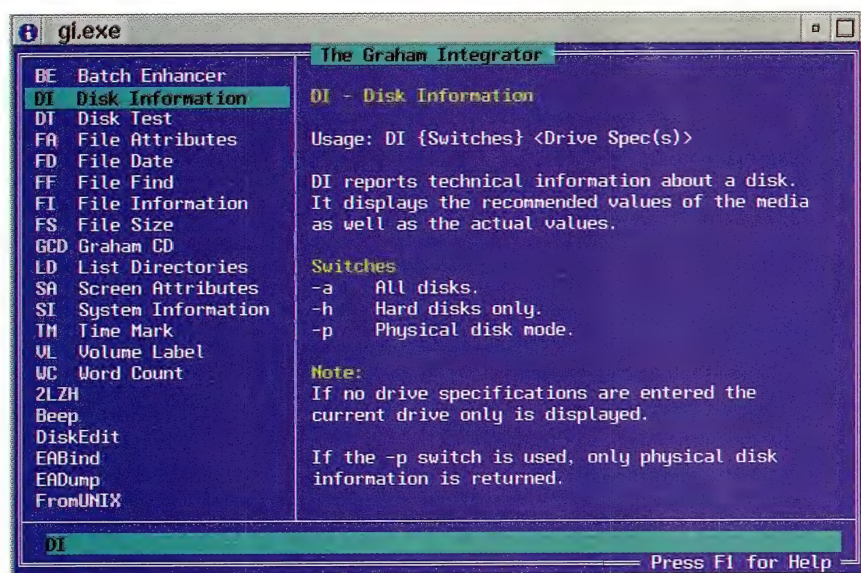


Figure 2: The Graham Integrator provides a kind of "cheat sheet" for each utility.

The most interesting tools are those that are specific to OS/2. EABind will connect information to the extended attributes of a file. For example, you can store the comment "This is the coolest file I've ever seen" in the extended attributes of your *config.sys*. EADump will create a hexadecimal listing of a file's extended attributes. I would prefer that EADump have a few more options (in particular, the ability to list only selected attributes or search for a keyword in the EAs) but it's more than adequate. The System Information (SI) utility presents an abundant quantity of information about the computer's hardware and about the operating system's settings. Among many other things, SI identifies the system's display type, the current OS/2 MaxWait and Timeslice settings, and the drive that the system boots from. These might sound about as thrilling as reading the telephone book, but when you need to pry this sort of

information out of a recalcitrant computer, you'll be happy to have a tool that makes it easy to do so.

The feature set is missing some notable attributes. In particular, the Graham Utilities lack an equivalent to the Speed Disk hard-disk defragmenting tool, and doesn't have a file-unerase utility. Both are promised in a future release—they may be available by the time you read this article.

The manual is clear and straightforward. If you're a computer novice, be forewarned that the manual presumes a certain degree of comfort with technical topics. On the other hand, you shouldn't be using a hexadecimal editor on your hard disk unless you have a good idea of what you're doing. Although the developer is in Australia, technical support is readily available on CompuServe and through other electronic means.

You're probably already familiar with the GammaTech Utilities,

especially if you read my praise of them in "The Esther Utilities" (*OS/2 Magazine*, April 1994, pp. 50-56). If you have used the GammaTech Utilities, you're probably wondering if you need the Graham Utilities, too. Alas, I have bad news for your checkbook: you really should own both packages. Some of their functions overlap but, in general, you will use each package for different things. Until The Graham Utilities provides an Unerase program, you'll need GammaTech's tool. GammaTech doesn't provide a way to edit the hard disk as directly, however, so you need The Graham Utilities if you think you'll ever need to.

It's always a joy for a reviewer to say that a piece of software is useful, clearly going to get even better, and worth your money. We all like the days on which we can say that the program quietly goes about its business and does exactly what it claims. This is one of those happy times.

Esther Schindler is a computer consultant and writer. She is a contributing editor to OS/2 Magazine, the sysop of the Ziffnet Executives Online Forum on CompuServe, and the author of The New Riders Guide to Modems, from New Riders Publishing. You can contact her via CompuServe at 72241,1417.

RESOURCE:

The Graham Utilities (\$133)

WarpSpeed Computing
P.O. Box 212
Brunswick VIA 3056
Australia
(61) 3-384-1060
(61) 3-386-9979 (fax)

READER SERVICE NO. 199

Three Reasons to Try the Future of Business Computing™ Free for 30 Days!

PenD/rect™

for OS/2™

a product of FTG Data Systems



1 **PenDirect is the most direct link between you and your application** — PenDirect's one-to-one cursor interaction means long-term computer use that's simple and effortless. The pen's precise and quick input maximizes cursor control to eliminate "mouse dyslexia." You'll find your natural hand/eye coordination beats fumbling with an awkward mouse any day. Light pens also eliminate the tedious wrist movements associated with mice that cause fatigue and repetitive strain injuries.

2 **Add pen support instantly to all your applications** — PenDirect works great with all of your OS/2 software, with no extra programming or customization. PenDirect fully supports all OS/2 2.x, Pen for OS/2, Windows and DOS apps — at any screen resolution. Everything you need is included in the package, no special monitor is required, and PenDirect lets you continue to use your mouse.

3 **FREE trial offer and software** — Try the pen free for 30 days — after 30 days you may return the pen or keep it and pay just \$298. No strings, no catches. You must be convinced PenDirect is the best input device for OS/2 or return it and owe nothing.

And for a limited time, get our Pen for OS/2 driver absolutely free with your paid order — that's a \$49 value FREE!

**For a free 30-day evaluation unit,
or more information, call:**

800-962-3902

714-995-3900 • FAX 714-995-3989

**FTG DATA
SYSTEMS**

8381 Katella Avenue
Stanton, California 90680

**Late-Breaking
Developments in the
World of OS/2**

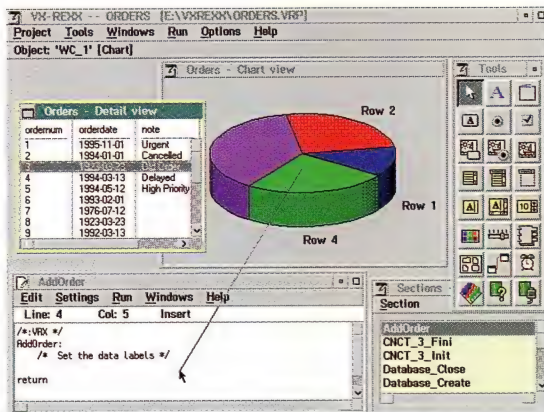
Just Announced

VX-REXX 2.1 Client/Server

Visual REXX hits the big time

Watcom International is releasing VX-REXX, a visual application builder for OS/2. VX-REXX version 2.1 features numerous performance enhancements and drag-and-drop programming capabilities. The VX-REXX Client/Server Edition brings VX-REXX's ease of use to client/server GUI application development on OS/2 by incorporating database objects. The new connection, query, and charting objects enable users to access several databases, manipulate data, and chart results. VX-REXX 2.1 sells for \$99, and the VX-REXX Client/Server Edition 2.1 sells for \$299. Call Watcom International at (519) 862-4514.

READER SERVICE NO. 200



WatchIt! 2.0

Keep an eye on LAN Server

WatchIt Release 2.0 provides the LAN administrator of an IBM LAN Server with a powerful tool to capture data for analysis and management of performance and capacity. Facilities include full support for IBM LAN Server 4.0 and earlier releases, automatic or manual data collection, notification via popup, messaging, logging, or alerts when degradation occurs, a full 32-bit and PM application that is certified to be "OS/2 ready," more extensive data capture and reporting, a complete GUI interface, and much more. The price is \$349 per server. Call Client Server Networking at (203) 233-2951.

READER SERVICE NO. 203

Review 1.0

Document Management for OS/2

Solution Technology is releasing Review, a fast image archival, storage, and retrieval system with direct scanner support in OS/2. Its features include a Hierarchical file system, extensive file-format support, file conversion for importing images, a simple and flexible document-folder system, an unlimited number of image folders, printing of scanned and archived images, and fast retrieval and searching capabilities by name, date, description, author, or folder. Documents can be anywhere from one to 1,000 pages in size, and each folder can contain 512 documents. Review sells for \$299. Call Solution Technology at (407) 241-3210 or fax (407) 997-6518.

READER SERVICE NO. 201

Golden CommPass for SMP 2.11

CompuServe with Multiprocessing

Creative Systems Programming has just released Golden CommPass for SMP, which exploits the symmetrical multiprocessing version of OS/2. Golden CommPass is the only native OS/2 communications package designed specifically for automating access to the CompuServe Information Service by using multiple threads to perform its work. Golden CommPass for SMP allows each thread to actively run on a different processor, causing significant improvements in throughput. Golden CommPass for SMP is priced at \$99. Call Creative Systems Programming at (609) 234-1500 or fax (609) 234-1290.

READER SERVICE NO. 202

SMART 2.0

Windows Source-Code Migration

One Up Corp. is releasing SMART 2.0, an enhanced version of its popular migration toolset. It supports 16-bit and 32-bit Windows application migration to 32-bit OS/2, as well as 16-bit OS/2 to 32-bit OS/2. SMART 2.0's features include an Analysis and Reporting Tool, which sizes a conversion effort and provides a road map for the migration, and a Source Migration Tool, which changes up to 70 percent of the API and message code. SMART 2.0 is priced at \$14,999. Call One Up Corp. at (214) 931-3499 or fax (214) 620-9626.

READER SERVICE NO. 204

Just Announced

DCF/2 1.2

HPFS Compression Revisited

Proportional Software is announcing the latest update to DCF/2, its OS/2 compression product. The latest version includes improved speed in formatting compressed drives, HPFS caching, support for

multiple HPFS volumes, and integration with standard OS/2 Shutdown. The release features two new utilities: a disk compression analysis tool for analyzing compressed drives and the DCF/2 packer program for recompressing and reclaiming disk space from compressed drives. This release is

free for all registered users of DCF/2 1.x and costs \$149.95 for new customers. Call Proportional Software at (800) 666-4672 or (303) 484-2665.

READER SERVICE NO. 205

Ksort for OS/2 1.0

Sort 'em faster

Scott Consulting announces the release of Ksort for OS/2. This 32-bit program is a utility for sorting any file as large as 50 percent of available disk space. This package includes a command-line version and a PM version of Ksort. Ksort works with LAN Server versions 2.0 and 3.0 and requires OS/2 2.1 or higher. The price for Ksort is \$189. Call Scott Consulting at (800) 840-2172 or (510) 275-9123.

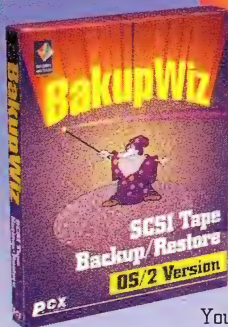
READER SERVICE NO. 206

TCP/2 OS/2 Components 1.6

Complete TCP/IP for OS/2

Essex Systems is releasing the latest version of its OS/2 TCP/IP Components. These utilities are for hooking up OS/2 machines to a TCP/IP network. The basic package is the Transport and Configuration package, which includes the necessary drivers to get started—including those for PPP and SLIP. The Basic Client Pack includes communication utilities such as FTP and Telnet. The Advanced Client Pack includes most major TCP/IP mail utilities, and the Server Pack includes various Server utilities. Other packages in this series offer DOS/Windows, NetBIOS, and NFS access, SNMP Tools, a Developer Tool Kit, and a Domain Server kit. The Transport and Configuration package is priced at \$200. Pricing for the other kits varies. Call Essex

Your One Stop for OS/2 Backup...



BackupWiz

OS/2 BackupWiz is the SCSI tape backup solution you have been looking for! Designed to exploit OS/2's multiple threading, BackupWiz gives you a quick and reliable method to completely back up your OS/2 system. HPFS and FAT file systems are supported and Extended Attributes, Long File Names, System files, and the Workplace Shell are backed up.

You can even restore your entire OS/2 boot volume from tape!

Ease of use is another of OS/2 BackupWiz's strong points. A simple, character oriented menu interface and command line operation are provided. OS/2 BackupWiz comes with support for most 1/4", 4mm (DAT), and 8mm tape devices. BackupWiz can also backup to other hard drives, file servers, minis/mainframes via TCP/IP, and removable drives including Bernoulli, Syquest, diskette, and magneto optical. There is even a version of OS/2 BackupWiz that supports many of the automatic tape changer mechanisms. Any SCSI host adapter that has an ADD driver can be used with OS/2 BackupWiz.

PCX also works hard to keep you satisfied after the sale with outstanding customer support. Being a small and aggressive company means that we can respond to your needs that much quicker.

OS/2 BackupWiz is priced at \$149 (autochanger version \$399). PCX also has a **competitive upgrade program** where you can purchase OS/2 BackupWiz for just \$49 by sending in an eligible competing product. We offer a 30 day money back guarantee to protect you in case OS/2 BackupWiz does not work for you!

Call our toll free number and order today!



PortaTape



PortaTape is your complete portable tape backup solution for OS/2. Using high speed SCSI tape devices, the PortaTape line offers capacities ranging from 250 megabytes to 10 gigabytes. Offering backup speeds from 6 to over 18 megabytes per minute when using a high speed, bidirectional printer port, units in the PortaTape series are priced from \$995.

Members of the PortaTape series utilize a range of SCSI tape drives including 1/4 inch, 4mm, and 8 mm mounted in low profile external enclosures. Connection to the host system is via the system's parallel printer port, which may be utilized concurrently with tape drive operation. A copy of OS/2 BackupWiz is included with each PortaTape.

PCX also markets a complete line of standard SCSI tape backup units ranging in capacity from 250MB to over 10GB. Available in both internal and external models, these units are priced from \$550. For very large backup needs, PCX offers robotic tape loader mechanisms from 48GB to over 1 terabyte.

FOR MORE INFORMATION OR TO ORDER CALL:

1-800-800-4PCX

PCX

3525 Del Mar Heights Road, Suite 313, San Diego, CA 92130 • (619) 259-9797 • (619) 481-6474 FAX

Shipping is non-refundable. No cancellations on special order items. 20% restocking fee on hardware refunds within 30 days. No refunds or exchanges after 30 days. Prices subject to change.



Reader Service No. 20

Just Announced

Systems at (508) 750-6200, or fax (508) 750-4699.

READER SERVICE NO. 207

Entry Field Object Pack for VX-REXX

Fielding entries for VX-REXX

DB Technologies is announcing their release of a set of data-entry objects for Watcom's VX-REXX. This package includes formatted entry fields for date, time, currency, telephone number, Social Security number, and Zip-codes. The entry-field objects were written in C, are SOM-based, and are available from the VX-REXX toolbar. The package includes royalty-free distribution, and costs \$39.95. Call DB Technologies (813) 378-3760 or fax (813) 378-3760.

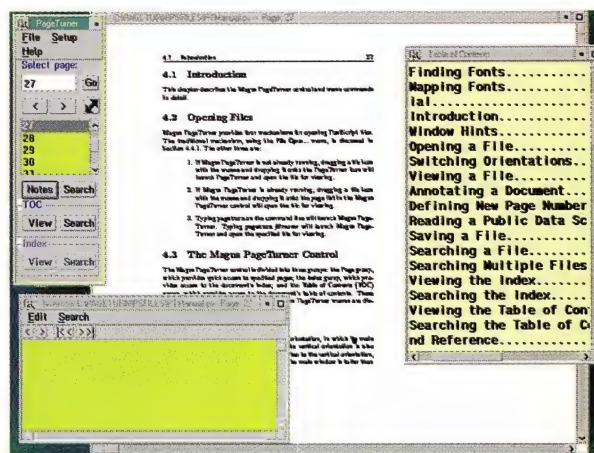
READER SERVICE NO. 208

View PostScript files without a printer

Magus PageTurner 1.0.1

Magus is announcing the release of PageTurner, an OS/2 PostScript-viewing program. This utility can be used to view any PostScript document—including those embedded with ATM Type 1 and Type 3 fonts, bitmap fonts, and other images. Document-structure support includes random page extraction, keyword searching, and support for arbitrary page numbering. Documents that are viewed can be panned and zoomed in multiple directions and can be printed to any printer. PageTurner 1.0.1 retails for \$199. Call Magus at (415) 940-1109 or fax (415) 940-1238.

READER SERVICE NO. 209



The secret's out!



- Native OS/2 spreadsheet •
- Easy • Fast • Powerful •
- REXX scripting • Objects to the core •

MESA™ 2
for OS/2

TO ORDER: CALL
1.800.315.MESA

The spreadsheet that's more than the sum of its parts.

ATHENA DESIGN
SPREADSHEET EXCELLENCE

17 St. Mary's Court
Boston, MA 02146
phone 1.617.734.6372
fax 1.617.734.1130

Limited Time
\$99.
Introductory
Offer

Now The Most Efficient Way To Work In OS/2. Is Also The Most Affordable.

You can realize the true power of OS/2 with
SkyScraper, DESKTOP MANAGER for OS/2!

Switch between your open applications instantly,
run all your applications full screen at the SAME TIME!
And completely customize
your OS/2 environment! You can even
launch programs
and DOS sessions
with our Program
Launcher.

All this
for
\$69.95
(Reg. \$99.95)

Save \$30.00 Off
Of Regular Price
And Organize Your Desktop!
Call 1-800-228-0666
and give the priority code U94003



Binar Graphics, Inc.
30 Mitchell Blvd.
San Rafael, CA 94903-2034

Member
OS/2
Vendor Council

EDITORS'
CHOICE
AWARD
OS/2
MAGAZINE
1994

Reader Service No. 22

Reader Service No. 21

WatcomTM VX•REXXTM

Visualize the Power of OS/2

NEW
CLIENT/SERVER EDITION

- Easily bind objects directly to your database
 - Quickly connect to your database
- Visually generate and test your SQL query
- Rapidly create more than a dozen chart types with over 150 display options

PLUS
All of the Powerful Features
of the New VX•REXX
Version 2.1

NEW **VX•REXX**
VERSION 2.1

- Over 2 dozen objects, including CUA'91 Containers, Notebooks, Pop-up Menus and more
- Integration and control of existing applications through DDE, keystrokes or REXX API's
- Easy to learn event-driven programming model with complete on-line documentation
- Context-sensitive help
- Powerful drag-and-drop programming techniques simplify programming
- Develop professional multi-threaded, multi-windowed and drag-and-drop enabled applications
- Code reusability through section sharing
- Include OS/2 style help and hints in your applications
- Advanced interactive source-level debugger
- System Object Model (SOM) based object manager
- Package your application as an EXE or PM macro for royalty-free distribution
- Integrated console window support simplifies migration of existing REXX programs

Watcom VX•REXX is an award winning, easy to use visual development environment for creating OS/2 applications with rich graphical user interfaces. VX•REXX combines a project management facility, visual designer and an interactive source-level debugger to deliver a very approachable and highly productive visual development environment.

Design Applications Visually

Create rich graphical applications quickly and easily using the visual design environment. With the visual designer, you can graphically create CUA'91 Presentation Manager interface objects, quickly customize their properties, and easily attach REXX procedures using powerful drag-and-drop programming techniques.

Integrated Development Environment

Build, test and debug your application without leaving the development environment. Then package your application as an EXE file or PM macro for royalty-free redistribution. The power of the integrated development environment and debugger can also be used with your existing REXX applications.

Powerful Open Environment

Enjoy the simplicity of event-driven programming together with the global editing capabilities essential for professional project management. Watcom VX•REXX is open and extensible through IBM's object-oriented System Object Model (SOM) technology. You can access all standard REXX API's including DB2/2, because VX•REXX is based on the OS/2 2.x standard system REXX.

Experts Agree... "Using VX•REXX for development is like driving a Porsche:

It's fast, it's compact, everything's in the right place, and it makes us look good, too."

Peter Coffee, PC WEEK, May 2, 1994.

"(VX•REXX) applications can be multithreaded and REXX is probably the easiest language in which to learn the OS/2 thread model."

Software Development, November, 1993.

"VX•REXX is a great tool; it's fun and productive."

PC Techniques, Dec/Jan. 1994.



for OS/2



February 8, 1994
Watcom VX•REXX, Version 1.01



"The best new development tool of 1993"

Watcom VX•REXX

Version 2.1.....**Special Price \$99**
Client/Server Edition.....**Special Price \$299**

1-800-265-4555

Watcom

A Powersoft Company



Watcom International 415 Phillip Street, Waterloo, Ontario, Canada. N2L 3X2 Phone: (519) 886-3700 Fax: (519) 747-4971

*Prices and specification are subject to change without notice. Price does not include freight and taxes where applicable. Prices quoted in US dollars. Watcom, the Lightning Device, and VX•REXX are trademarks of Watcom International Corporation. Other trademarks are the properties of their respective owners. ©Copyright 1994 Watcom International Corporation.

Parsing and Templates

INSIDE PARSE, TEMPLATES, TRAP PROCESSING, AND REXXUTIL BY DICK GORAN

This month, I will cover some of the topics that result in the most frequently asked questions by new REXX programmers about the **parse** instruction and use of templates, function use via the **call** instruction versus functions used as expressions, trap processing, and registering REXXUTIL in your *startup.cmd* file.

The parse instruction

The **parse** instruction is one of the most powerful instructions in the REXX language. Two references that provide a full explanation of the **parse** instruction and all of the variations of template patterns that can be used with it can be found in *The*

Rexx Language and IBM's *Procedure Language/2 REXX Reference*.

The **parse** instruction allows strings to be separated (split) and the resulting segments to be assigned to variables, from left to right. Control over how the string is parsed is determined by a user-supplied template or an implied default template. The form of the template can cause some confusion with new REXX users.

Seven different forms of the **parse** instruction exist. However, templates determine how the source string is split in every case. Table 1 shows the definitions of the **parse** keyword instruction and Table 2 shows the template symbols.

In its simplest form, the **parse** instruction is used to separate a string into words. A word is considered a string of non-blank characters delimited by one or more spaces. When the **parse** instruction is used to separate words, the instruction processes multiple spaces as if they were a single space. Each successive word, from left to right, is assigned to the variable names specified in the template with special consideration given to the last word. Every variable name included in the template is assigned a new value. If more words exist than variable names, everything following the word assigned to the next-to-last

Fragment 1:

```
/* .+....1....+....2....+....3....+....4..*/
PARSE VALUE 'The quick red fox' WITH,
    a,
    b,
    c
```

Fragment 2:

```
/* .+....1....+....2....+....3....+....4..*/
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
    day_abbrev ',',
    month_day_year
```

Fragment 3:

```
/* .+....1....+....2....+....3....+....4..*/
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
    day_abbrev ',',
    month,
    day,
    year
```

Fragment 4:

```
/* .+....1....+....2....+....3....+....4..*/
comma = ','
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
    day_abbrev (comma),
    month,
    day,
    year
```

Fragment 5:

```
/* .+....1....+....2....+....3....+....4..*/
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
    day_abbrev 6,
    . 9,
    month 15,
    day 19,
    year
```

Fragment 6:

```
/* .+....1....+....2....+....3....+....4..*/
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
    day_abbrev +6,
    . +2,
    month +6,
    day +4,
    year
```


Table 1: Parse keyword instruction.

parse [upper] arg [template]

Parses the arguments according to the specified template from a function or subroutine call, optionally first translating them to uppercase.

parse [upper] linein [template]

Parses the input from the default character input stream according to the specified template, optionally first translating it to uppercase.

parse [upper] pull [template]

Parses the next line in the REXX data queue according to the specified template, optionally first translating it to uppercase. If the queue is empty, lines will be read from the standard input stream (normally the keyboard).

parse [upper] source [template]

Parses the program's source information according to the specified template, optionally first translating it to uppercase. The following data is an example of the data returned by the **parse source** instruction:

```
OS/2 COMMAND      C:\OS2\REXXTRY.COMD
OS/2 SUBROUTINE   D:\OS2\REXXTRY.COMD
```

parse [upper] value [expression] with [template]

Parses the value of expression according to the specified template, optionally first translating it to uppercase.

parse [upper] var name [template]

Parses the value of **name** according to the specified template, optionally first translating it to uppercase.

parse [upper] version [template]

Parses the information describing the language processor and level, followed by its date, according to a specified template, optionally first translating it to uppercase. Here is an example of the data returned by the **parse version** instruction:

```
REXXSAA 4.00 08 Jul 1992
REXX/Personal 4.00 8 Feb 1993
```

variable, including the remaining spaces, is assigned to the last variable, as shown in Fragment 1.

This instruction will result in "The" being assigned to the variable **a**, "quick" being assigned to the variable **b**, and "red fox" being assigned to the variable **c**.

If four variables were specified in the template in this example instead of three, the first three words would be assigned to the first three variables, stripping the surrounding spaces prior to the assignment. However, the last variable would still have leading spaces. These spaces could be removed by

using the **STRIP()** built-in function in another assignment statement. If more variables are specified in the template than the number of words in the source string, the extra variables are assigned a null string value ("").

A literal string can be used to specify the delimiter that the **parse** instruction uses instead of the implied delimiter of a space. Any number of literal strings and variable names can be specified, as shown in Fragment 2. This code would result in "Thurs." being assigned to the variable **day_abbrev** and " Sept. 29, 1994" (note the

Table 2: Template symbols.

Following is a list of symbols separated by blanks or patterns.

variable name	the name of a variable to be assigned a value.
literal	used to match within the input string.
(variable name)	variable whose value is used to match the input string.
. (period)	a placeholder that receives part of the input string, except that no assignment is actually performed.
integer	absolute character position in the input string.
=integer	same as preceding.
+integer	relative position in the input string.
-integer	same as preceding.
=(variable name)	variable whose value specifies an absolute character position.
+(variable name)	variable whose value specifies a relative character position.
-(variable name)	same as preceding.

In addition, a comma can be used in the template for **parse arg** to indicate that the next argument becomes the input string for the following portion of the template.

leading spaces). However, the code shown in Fragment 3 will result in the value "Thurs." being assigned to the variable **day_abbrev** and the values "Sept," "29," and "1994" being assigned to the variables **month**, **day**, and **year** respectively without any extraneous spaces.

Any combination of delimiters can be used in a single **parse** instruction. If the delimiter is assigned to a variable, the variable name must be enclosed within parentheses. The example shown in Fragment 3 could be written as shown in Fragment 4.

The next variation of the parsing template is the numeric positional pattern. It is similar to the literal string shown in Fragment 4, except that the numeric positional pattern indicates the position at which the next token from the source string begins. In the example shown in Fragment 5, all spaces are single spaces, which results in "Thurs." being assigned to the variable **day_abbrev**, the period placeholder results in the comma and space being bypassed, and the values "Sept." "29," and "1994" being assigned to the variables **month**, **day**, and **year**, respectively. Both **month** and **day** would contain a trailing space.

The template can contain a pattern of relative positional values instead of absolute values. The positional numbers can be relative to the last number used. Therefore, the code shown in Fragment 6 would yield the identical result as in Fragment 5.

Fragment 7:

```
/* .+...1....+...2....+...3....+...4*/
abbrev_lgth      = 7
month_pos       = abbrev_lgth + 2
day_pos         = month_pos + 6
day_lgth        = 4
PARSE VALUE 'Thurs., Sept. 29, 1994' WITH,
               day_abbrev =(abbrev_lgth),
               .          =(month_pos),
               month      =(day_pos),
               day        +(day_lgth),
               year
```

As with literal string patterns, the positional patterns can be specified as a variable by inserting the variable name in the template enclosed in parentheses in place of the number. An absolute position number is indicated by the use of an equal sign (=). The relative indicator (+, -, or =) must precede the left parenthesis. Therefore, Fragment 6 could also be written as shown in Fragment 7.

Function usage

The REXX instruction set was designed so that it could be easily enhanced by external functions. The REXX functions fall into two categories: built-in and external. Table 3 shows the built-in functions that are part of OS/2 REXX. All of the built-in functions in the table (except those marked with an asterisk) are defined in the REXX language specification

BACKUP, RESTORE, MANAGE AND SECURE YOUR WORKPLACE SHELL DESKTOP WITH **DeskMan/2**

**NEW!
VERSION 1.5
NOW AVAILABLE**

DeskMan/2™ is the first
and only tool designed to
manage the Workplace Shell™!

DeskMan/2 for OS/2 is unmatched in its ability to fully exploit the power and versatility of OS/2! Managers can use its security features to protect access to windows or objects. Administrators can easily and quickly standardize a department's desktops for maximum job efficiency. Individual users can quickly and easily migrate icons, objects and desktops between office and home machines. Or use **DeskMan/2** to backup and completely restore a custom desktop.

Incorporating the powerful **VUEMan/2™** virtual desktop & window manager; the potent new WPS snapshot facility; and more, **DeskMan/2** is packed with features!

New & Enhanced Features:

- Enhanced for ease of use
- Improved performance & functionality
- Improved window management
- Available object-level security
- Complete control over object menus
- New easy-to-use installer

Significant enhancements to every component!

- API & GUI for local & remote access
- CID enabled & LAD/2 supported
- Delete "undeletable" objects
- Prevent the deletion of any object
- Query any object for settings
- Secure individual windows
- Secure groups of windows
- Change multiple folders or icons all at once -- just drag and drop
- Full administrative control of features
- Restore, save, migrate any/all objects
- Total management of Workplace Shell
- And much more ...
- Call DevTech for current info!

DevTech

Development Technologies, Inc.
Software Development & Technology Transfer
308 Springwood Road, Forest Acres, SC 29206-2113 Voice: (803) 790-9230 Fax: (803) 738-0218

© Copyright 1994 Development Technologies, Inc. All rights reserved. DeskMan, DeskMan/2 and VUEMan/2 are trademarks of Development Technologies, Inc. Workplace Shell is a trademark of International Business Machines Corporation (IBM), and OS/2 are registered trademarks of International Business Machines Corporation.

Table 3: REXX Built-in functions.

ABBREV	D2X	MAX	SUBWORD
ABS	DATATYPE	MIN	SYMBOL
ADDRESS	DATE	OVERLAY	TIME
ARG	DELSTR	POS	TRACE
B2X	DELWORD	QUEUED	TRANSLATE
BEEP *	DIGITS	RANDOM	TRUNC
BITAND	DIRECTORY *	REVERSE	VALUE
BITOR	ENDLOCAL *	RIGHT	VERIFY
BITXOR	ERRORTXT	RXFUNCADD *	WORD
C2D	FILESPEC *	RXFUNCDROP *	WORDINDEX
C2X	FORM	RXFUNCQUERY *	WORDLENGTH
CENTER	FORMAT	RXMESSAGEBOX *	WORDPOS
CENTRE	FUZZ	RXQUEUE *	WORDS
CHARIN	INSERT	SETLOCAL *	X2B
CHAROUT	LASTPOS	SIGN	X2C
CHARS	LEFT	SOURCELINE	X2D
COMPARE	LENGTH	SPACE	XRANGE
CONDITION	LINEIN	STREAM	
COPIES	LINEOUT	STRIP	
D2C	LINES	SUBSTR	

All other functions are external functions and are defined within either another REXX program or a DLL (dynamic link library) module. The *rexutil.dll* is a part of OS/2 REXX and contains the 30 functions shown in Table 4.

and, therefore, should be available across all platforms that provide the REXX programming language.

All functions not shown in Table 3 are external functions and are defined either within another REXX program or a dynamic link library (DLL) module. *Rexutil.dll* is a part of OS/2 REXX and contains the 30 functions shown in Table 4.

The functions in Table 4 provide access and control of OS/2-related functions and data. Other third-party external function modules are available as freeware and shareware from various OS/2 related BBSs, or from commercial vendors.

All REXX functions can be referenced with the **call** keyword instruction or used any place in a REXX clause where an expression is allowed. When explicitly called, each parameter that is passed to the function, except the last, is terminated with a comma. For example, **call date 'n'** results in the system date, in the format "dd Mon yyyy" (where "dd" represents the current day, "Mon" represents the current month abbreviation, and "yyyy" represents the four-digit year). This result is stored in the special REXX variable **result**. The user program can then assign the contents of **result** to another variable. A **call** to any other function causes the value returned by the call to the **DATE()** function to be replaced. This example could be written using the function as an expression, for example:

```
today's_date = DAY( 'N' )
```

When any function is used as an expression, the function name *must* be immediately followed by a left parenthesis (no intervening space is allowed). Any number of spaces can surround the fields that occur within the parentheses.

It is clearly more meaningful to use the **DATE()** function as an expression. However, other functions, particularly those that return values that are not signifi-

Listing 1: The NOVALUE condition.

```
/* 9401FIG3.CMD - Show NOVALUE */ /* 0001 */
trace r /* 0002 */
signal on NOVALUE name NOVALUE_TRAP /* 0003 */
a = 1 /* 0004 */
c = a + b /* 0005 */
exit /* 0006 */
/* 0007 */
NOVALUE_TRAP: /* 0008 */
say 'NOVALUE trap on source line' SIGL /* 0009 */
exit /* 0010 */

3  *-- Signal On NOVALUE Name NOVALUE_TRAP;
4  *-- a = 1;
   >>> "1"
5  *-- c = a + b;
8  *-- NOVALUE_TRAP:
9  *-- Say 'NOVALUE trap on source line' SIGL;
   >>> "NOVALUE trap on source line 5"
10 *-- Exit;
```


cant, are more meaningful to the observer when used with the **call** keyword instruction. Remember, that the **result** special variable is assigned a value when a function is used.

Trap processing

REXX provides the user with the ability to "trap" unusual occurrences. Trapping alters the program flow when a specified event occurs and provides the program with the information necessary to identify the event. Six events can be monitored: **ERROR**, **FAILURE**, **HALT**, **NOTREADY**, **NOVALUE**, and **SYNTAX**. Each of these conditions is briefly described in the *rexx.inf* file on your system and can be found by doing a search on the word "signal." A full explanation of the six conditions goes beyond the scope of this column, however, I do want to describe the use of the **NOVALUE** condition and how it can be implemented.

Because REXX is an "untyped data structure" language (meaning that variables need not be previously defined prior to their use), many programmers feel uncomfortable taking advantage of the convenience it provides. Still others decry this coding style as a negative characteristic of the language.

Much of the negative criticism can be overcome by use of the **NOVALUE** condition associated with the **call** or **signal** keyword instruction. Either of these two instructions, when used with the **NOVALUE** condition, cause program flow to be interrupted and redirected to the label specified within the **call** or **signal** clause. That is, the label that defaults to the condition name, receives control, when an uninitialized variable is used in a program for any purpose other than to assign a value to it.

Listing 1 contains both the source statements and the output of the **trace** instruction, which

Table 4: External Functions.

SysCls	SysFileSearch	SysRegisterObjectClass
SysCreateObject	SysFileTree	SysRmdir
SysCurPos	SysGetEA	SysSearchPath
SysCurState	SysGetKey	SysSetIcon
SysDeregisterObjectClass	SysGetMessage	SysSetObjectData
SysDestroyObject	SysIni	SysSleep
SysDriveInfo	SysMkdir	SysTempFileName
SysDriveMap	SysOS2Ver	SysTextScreenRead
SysDropFuncs	SysPutEA	SysTextScreenSize
SysFileDelete	SysQueryClassList	SysWaitNamedPipe

Listing 2: startup.cmd

```
*Register REXXUTIL in STARTUP.CMD */
if RXFUNCQUERY( 'SysLoadFuncs' ) = 0 then
    return /* function registered */

if RxFuncAdd( 'SysLoadFuncs', 'REXXUTIL', 'SysLoadFuncs' ) = 0 then
do
    call SysLoadFuncs
    if RESULT <> '' then
    do
        Say 'SysLoadFuncs ' ||,
            'returned ' ||,
            RESULT
        exit
    end
end
else
do
    Say 'RxFuncAdd returned ' ||,
        RESULT ||,
        'registering REXXUTIL'
    exit
end
```

result from the presence of an uninitialized variable, along with the reference to the variable being trapped. When reference is made to variable **b**, control transfers to the label **NOVALUE_TRAP** because **b** is an uninitialized variable (it has not had a value assigned to it).

In summary, the **call** and **signal** instructions should always be used in REXX programs of any length to prevent the unintended use of uninitialized variables, as well as other exception conditions that can occur within a REXX program.

Registering External Modules in startup.cmd

The **RxFuncAdd()** function makes a DLL known to the REXX interpreter in any given session. However, the entry points within the DLL are not really registered until one of two conditions occur. Either the individual function entry points within the DLL must be called or referenced in an expression or an entry point designed into the DLL that registers all of the other entry points in the DLL must be referenced.

Once a function name or entry point is registered, it is then available to all sessions. *Rexxutil.dll*, which is a part of REXX that is distributed with OS/2, is a DLL that provides an entry point that allows all of the individual functions within the DLL to be registered. That entry point name is **SysLoadFuncs**.

Because almost every REXX program you use will want to have access to the various functions within *rexutil.dll*, and since a single call to **SysLoadFuncs()** results in all of the functions in the DLL being available to all other OS/2 sessions, by placing a registration call to *rexutil.dll* and its self-registering entry point in your *startup.cmd* file in the root directory of your OS/2 drive, it will not be necessary to register it in any of your other REXX programs.

If you already have a *startup.cmd* file, you probably already have the parameters shown in Listing 2

included in it as well. If you do not have a *startup.cmd* file, simply create one with your favorite ASCII editor with the instructions in Listing 2. The *rexutil.dll* functions will then be available in all other sessions.

RESOURCES:

REXX Reference Summary Handbook (\$19.95)

by Dick Goran
C F S Nevada, Inc.
(702) 732-9616
fax: (702) 732-3847
(ISBN 0-9639854-1-8)
IBM SRL & PUBORDER S246-0078-00
READER SERVICE NO. 210

OS/2 2.0 Procedures Language 2/REXX Reference Guide (\$15.00)

IBM Corp.
(800) 879-2755
IBM SRL S10G-6268-00
READER SERVICE NO. 211

OS/2 2.0 Procedures Language 2/REXX Users' Guide (\$10)

IBM Corp.
(800) 879-2755
IBM SRL S10G-6269-00
READER SERVICE NO. 212

REXX Language (\$41)

by M. F. Cowlishaw
Prentice-Hall
(800) 947-7700
(ISBN 0-13-780651-5)
READER SERVICE NO. 213

Dick Goran is the author of the REXX Reference Summary Handbook, an OS/2 reference. He has been in the computer industry since 1961 and was in the IBM mainframe systems software development business until 1987. He can be reached at 71154,2002 on CompuServe, 71154.2002@compuserve.com on Internet, HONE81 (DEV4672) on IBMLink, and receives Fido Netmail at 1:209/705.

ATF is the only testing product built for client/server.

That's right. We said *only*.

Building client/server apps? Then you need a testing product that knows there's more to client/server than a pretty interface and concurrent database requests.

Only ATF tests all layers of client/server: GUIs, distributed systems, legacy apps. Only ATF lets you model realistic client/server conditions, exercising your apps the same way your users will.

To find out just why the Automated Test Facility is the *only* product for testing client/server applications under OS/2, Windows, or Windows NT, call 617-576-2257. (Or FAX 617-864-7747.)



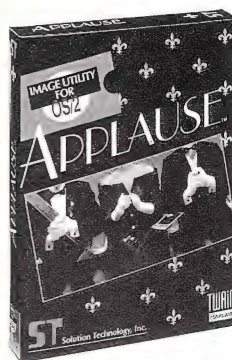
**The Softbridge
Automated Test Facility**

Softbridge, Inc. ▲125 CambridgePark Drive ▲ Cambridge MA 02140

Reader Service No. 25

The First Twain Enabled Image Scanning & Viewing Utilities for OS/2

APPLAUSETM



FEATURES:

- Fast Image viewing
- Easy Screen Capturing
- Quick File Conversion
- Efficient Color Modification
- Powerful Image Manipulation
- Real-Time Image Navigation

CURRENTLY

SUPPORTS:

- Logitech Scanman 256
- Hewlett Packard IIP
- Hewlett Packard IIC Series

After The **APPLAUSE** Comes

The REVIEWTM

Document Management System

- Flexible & Fast Search/Retrieval
- Multiple search Fields
- Network Support and more...

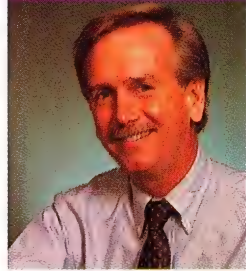


Solution Technology, Inc. 1101 South Rogers Circle, Bldg 14 Boca Raton, FL 33487
Tel: (407) 241-3210 Fax: (407) 997-6518

Applause and Review are registered trademarks of Solution Technology, Inc. All other brand names are trademarks of their respective owners.
©1994 Solution Technology, Inc.



Reader Service No. 26



What's in a Name?

GIVE YOUR FILES AND DIRECTORIES ANY NAMES YOU LIKE—WELL, ALMOST BY DICK CONKLIN

OS/2 gives you the freedom to be creative and to use descriptive names free of DOS's restrictions. Right? Well maybe, but not exactly. Even OS/2's High Performance File System (HPFS) imposes some limits when it comes to naming files and directories. File-name extensions are important too. The use of some file-name extensions can produce unexpected results. But, with a little planning, the right ones can make OS/2 easier to use.

FAT versus HPFS

When you installed OS/2, you had a choice between the File Allocation Table (FAT) or HPFS file system. The FAT file manager originated in 1981 with the first release of DOS. Its naming rules haven't changed much over the years; file names can have up to eight characters with an optional three-character extension. Only uppercase letters, numbers, and some special characters are allowed. Table 1 shows what works and what doesn't, and Listing 1 gives you some examples.

HPFS has a far more liberal naming policy. You can give your files and directories names of up to 254 characters with multiple periods and blanks used as separators. HPFS allows some additional characters,

FAT NAMES THAT ARE OK

xy
3408
help!
oct1994.{x}
c:\invoices.mar
exceeds.99%
abcdefgh.xyz
julie.19
\$39.95

Listing 1:

FAT NAMES THAT ARE NOT OK

xy
3408 Sherwood Boulevard
help?
oct1994.[x]
c:\1st;2nd
abc.def.xyz
\$25,000.95
Exceeds 99%

Listing 2:

HPFS NAMES THAT ARE OK

Sloppy Joe's Bar
c:\Key West, Florida
USA.New York.Guilderland

HPFS NAMES THAT ARE NOT OK

200+400=?
<Save this>
You/Can't/Do/This

such as commas, semicolons, and square brackets that don't work in FAT names. For some examples, see Listing 2.

You can use both upper and lowercase letters in your HPFS names. The rule is case preservation without case sensitivity—which means that OS/2 remembers exactly how you entered a name, at least when displaying it, but ignores the case of each letter when you enter a command. For example, if I store a file named *EasyWriter*, OS/2 will let me call it *EASYWRITER*,

EASYwriter, or *easyWRITER* when I load it again. I can't put files named *BigEasy* and *biGeASY* in the same directory, because HPFS treats them as the same name.

Neither FAT nor HPFS will allow certain names that have been reserved for system variables and ports. For example: variables (**KBD\$**, **SCREEN\$**, **POINTERS\$**, **MOUSES\$**, **CLOCKS\$**), printer addresses (**PRN**, **NUL**, **LPT1**, **LPT2**, **LPT3**), display address (**CON**), and communication Ports (**COM1**, **COM2**, **COM3**). However, if you add an extension to any of those names (such as *screen\$.x1* or *lpt1.prt*), they will work.

When blanks are part of a file or directory name, the name (including the optional drive and path) must be enclosed in quotation marks

when it is used in a command. For example:

```
COPY "C:\Florida\Delray
Beach" A:
```

Your applications may stifle some of your naming creativity. DOS applications, of course, don't support OS/2's HPFS, so their files will be named using the FAT-style eight-characters-plus-three-character-extension (8.3) rule. Many applications will not even let you give an extension, using it instead to iden-

When you display a folder of file objects, have you ever wondered why some files are shown with the generic file icon while others have different icons?

tify the files associated with the application. Some OS/2 applications will restrict you from entering HPFS-style names to provide compatibility with OS/2 FAT systems.

International considerations

Accented letters, such as â, é, î, ö, and ü may also be used in HPFS file names when a country-code page supports them. However, they can be a problem when files are exported from one country to another. The code-page location for a vowel in France may represent a different letter in Argentina, and the upper or lowercase rules may change. It's safer to stick with the universal A to Z (uppercase) letters and numbers, which are the same across most code pages.

FAT and HPFS compatibility

The exchange of files between HPFS and FAT-based OS/2 systems may dictate a lowest-common-denominator set of rules. If you are using HPFS to create floppy disks, they will always be FAT-formatted. You can carry that floppy to any OS/2 or DOS system and use it. When you copy HPFS files to a FAT disk, an interesting thing happens—the file gets *two* sets of names.

Table 1: File and directory naming rules.

	FAT	HPFS
Maximum length of file and directory names	Eight characters plus three-character extension (optional)	254 characters
Period (.) as separator	One	Any number
Numbers (zero to nine) and upper case letters (A to Z)	Yes	Yes
Lower case letters (a to z)	No	Yes
Blanks	No	Yes
Special characters:		
~ ! @ # \$ % _ ' ' { } ()	Yes	Yes
, ^ ; []	No	Yes
\ / ? * " = : + < >	No	No

When files are viewed from a DOS or OS/2 directory listing, only the FAT names appear. Long file names are truncated to eight characters, lowercase letters are folded to uppercase, and blanks are converted to the underline symbol.

However, HPFS *hides* the full original name on the FAT disk. If you view an icon display of the disk, you'll see the original HPFS name. And, if you copy the file back to an HPFS hard disk, the HPFS name will be restored.

Extensions and icons

Even if you restrict your file names to the lowest-common-denominator FAT rules, your name extensions

can still cause OS/2 to do strange things. For example, when you display a folder of file objects, have you ever wondered why some files are shown with the generic file icon while others have different icons? OS/2's built-in defaults assign the OS/2 System Editor icon to files with a *.txt* extension and the Icon Editor to files named with *.bmp*, *.ico*, or *.ptr* extensions. Many OS/2 applications use unique file extensions to identify their spreadsheet or word-processor files, and mark each one with an identifying icon.

This feature not only makes it easier to recognize a file type, or the program that created it, but it can simplify the way you work. By

clicking on a file icon, two things happen: the program (editor, spreadsheet, database, and so on) is started and the target file is loaded into it. An important feature of OS/2's Workplace Shell is the ability to select an object and immediately begin working on it.

When you are naming files, you might want to avoid using any of the common file extensions. In addition to those listed in Table 2, OS/2 uses *.dll* for Dynamic Link Library program files, *.sys* for system files (such as the all-important *config.sys*), *.drv* for device drivers, and so on. If you happen to give your Little League roster the file name *baseball.bat*, don't be surprised if it shows up with a little DOS icon, and if clicking on it causes OS/2 to try to run it as a DOS batch file.

But you can use this feature to your advantage. A file extension (or a whole class of files) can be *associated* with a program. HPFS's Extended Attributes make this association possible. In fact, here's a useful example that you can try for yourself.

Simplifying use of .inf files

OS/2's Information Presentation Facility (IPF) is a built-in, Hyper-text-like facility for browsing, searching, and printing files. Many applications are shipped with IPF files, each named with a *.inf* extension. IPF displays these files with its **view** command. For example, one way to read OS/2's on-line command reference is by opening an OS/2 window and entering:

```
VIEW C:\OS2\BOOK\CMDREF
```

to read the *cmdref.inf* file. But, you can associate the **VIEW** command with all of your *.inf* files, so that clicking on any of them will display them automatically in **VIEW** format. Here's how: open the *c:\os2* folder using mouse-button two, double-click on the *view.exe* file, and select **Settings** and the tab marked

Table 2: Common file-name extensions, icons, and actions.

Extension	Description	Icon	Default Action
<i>.exe</i>	OS/2 program		Runs program in OS/2 session
<i>.exe</i>	DOS program		Runs program in DOS session
<i>.com</i>	DOS program		Runs program in DOS session
<i>.cmd</i>	OS/2 command		Runs OS/2 commands in file
<i>.bat</i>	DOS batch File		Runs DOS commands in file
<i>.txt</i>	Unformatted text		File loaded by OS/2 System Editor
<i>.ico</i>	Icon		File loaded by OS/2 Icon Editor
<i>.bmp</i>	Bitmap		
<i>.ptr</i>	Pointer		
<i>.pif</i>	Picture interchange format		File loaded by OS/2 Picture Viewer
<i>.met</i>	Metafile		
	Other files		Other files are loaded by the OS/2 System Editor

Associations. In the New Name box, enter: **.inf* and select **Add**. Double-click on the title-bar icon to exit.

Now, open the *c:\os2\book* folder. All *.inf* files are now marked with IPF's own book icon. Double-click on *cmdref.inf*, and you are in business.

This method of associating a file-name extension with an application program can greatly simplify your use of OS/2. You can also associate files with your DOS and Windows applications. When you click on the icon of a DOS program-created file, you'll launch its associ-

ated DOS program. Whether or not the file and the program are loaded together depends on the program. If the DOS program is designed to accept a file name as an argument, it will load the file automatically. Otherwise, the program will run, but you'll have to take the extra step of loading the file.

Dick Conklin is editor-in-chief of OS/2 Developer, contributing editor to OS/2 Magazine and author of three OS/2 books. He can be reached at CompuServe 76711,1005 or Internet os2mag@vnet.ibm.com.



HARNESS THE POWER OF OS/2

INTRODUCING OS/2 MAGAZINE



Make the most of your PC with *OS/2 Magazine*! Every issue brings you the information you need to achieve maximum performance. From your hardware and software, to your operating system and peripherals.

OS/2 Magazine helps you harness the power of your PC. Why not flip open the next issue to timely feature articles like these:

- Common OS/2 problems and how to solve them
- How to detect OS/2 viruses—and keep your data safe
- Putting your OS/2 PC onto a local-area network
- Making multimedia applications come alive under OS/2
- Running Windows applications under the Workplace Shell

You'll also get hands-on tutorials. Expert technical advice. And unequivocally, unbiased product reviews—on HP Laserjets, S3 graphic boards and Intel fax modems, to name a few. Plus the latest news on OS/2, invaluable network support and more.

Reader Service No. 27

SEE FOR YOURSELF

First issue FREE! Check out the next issue of *OS/2 Magazine*. It's on us. If you like it, you can get a full year's worth (11 additional issues) for the low charter rate of \$29.95. You'll save 25% off the regular subscription rate!

Why not return the attached form today? You have so much to gain, and *absolutely* nothing to lose!

**SPECIAL
INTRODUCTORY
OFFER!**



YES! Send me a complimentary copy of *OS/2 Magazine*. If I like it, I can get a full year's worth (11 additional issues) for the low charter rate of \$29.95. I save 25% off what regular subscribers pay. If *OS/2 Magazine* is not for me, I'll simply write "cancel" on your invoice and that will be that. I owe *nothing*. I lose *nothing*. And the *FREE* issue is mine to keep.

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

Mail your order to: *OS/2 Magazine*, P.O. Box 56664, Boulder, CO 80323-6664, or call (800) 765-1291, or Fax (415) 905-2233.

Allow up to 6-8 weeks for delivery of your first issue. Canadian/Mexican subscribers please add \$10 for surface mail: overseas add \$40 for airmail. Prepayment drawn in U.S. dollars on a U.S. bank for foreign orders.

Any Port in a Storm

CONTROLLING DOS COMMUNICATIONS PROGRAMS UNDER OS/2 BY MARK MINASI



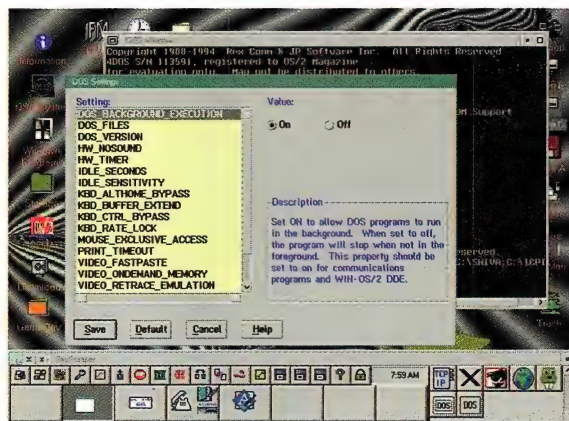
In last month's column, I talked about the mechanics of how OS/2 supports DOS programs. But, to get down to the real nitty-gritty of DOS-program support under OS/2, you have to understand the DOS Settings page associated with each DOS program object under OS/2.

Under OS/2, DOS programs (Windows programs, by the way, fall into the category of DOS programs) run in a kind of "imaginary PC" called a virtual machine. You can control the nature of this machine with the DOS Settings, which you can access with the pop-up menu on any DOS object. Click Open and Settings, which will open the familiar Settings page on that object's notebook, click on the Session tab, and you'll see a button labeled DOS Settings..., click on that button and you can get to work. You'll see a lot of settings, but don't be intimidated, many of them are direct analogs of *config.sys* commands that you already know, and some you can simply forget.

The first group of DOS settings concern the serial ports: **com_direct_access**, **com_hold**, **com_receive_buffer_flush**, and **com_select**. These settings can be quite important because they control an area of your computer that is a common source of trouble for programmers. Programmers use

**Of the
common devices that
programmers must
control, serial ports
are among the worst.**

tricks to handle settings that can pose problems for OS/2.



Of the common devices that programmers must control, serial ports are among the worst. Throughout the history of DOS programming, a tug-of-war between the desire for standard software interfaces and the desire for speed has been going on. Standard soft-

ware interfaces, like DOS itself, are attractive because they constitute a model of compatibility. Once everyone agrees to use the DOS (or OS/2 or POSIX or NT) software interface, application programmers will no longer have to worry about what kind of hardware their program will run on; all they need to be sure of is that the program runs atop DOS on some kind of machine. It was a noble thing to strive for but, unfortunately, the software overhead required to support DOS on early-1980s machines made early attempts at 100-percent DOS compatibility painfully slow.

These efforts produced textbook examples of how to write a DOS program, but were market failures due to awful performance. So, most vendors of DOS programs learned to write their code directly to the PC hardware, which is where our story returns to OS/2.

To support DOS programs, OS/2 must provide a virtualization of PC hardware—a bit of software sleight of hand that turns one PC into multiple virtual PCs. On much PC hardware, it isn't all that hard to do. With video, all OS/2 has to do is play traffic cop between the single actual physical video board in the system and the multiple DOS programs running in the OS/2 machine—each thinking it exerts sole control over that video board. OS/2 basically

PERSONAL SOFTWARE PRODUCTS



**Operate At
A Higher Level.™**

SAVE OVER 20%

Video Special

- Getting Started With OS/2\$39.95
- Productivity With OS/2.....49.95
- LAN for OS/259.95
- Optimizing With OS/239.95

Regularly 189.80

Special Price Only \$149.00!

Item No. 1296

**For Easy Ordering
Call 1-800-342-6672
and Ask For Item No. 1296
(9 A.M. to Midnight Mon.- Fri.
9 A.M. to 9 P.M. Sat., EST)**

**To Receive Your Free Catalog
of Additional OS/2 Products
Call Toll-Free 1-800-342-6672**



©1993 IBM Corp. All Rights Reserved. IBM and OS/2 are registered trademarks and Personal Software Products and "Operate At A Higher Level" are trademarks of International Business Machines Corporation. All other names and logos are (registered) trademarks of their respective companies.

I.D. #J9

IBM
®

assigns a kind of “watchdog” program called a Virtual DOS Device Driver (VDDD) to each DOS program, and all each copy of the video VDDD does is monitor its DOS program, looking for attempts to access the video board.

If the DOS program is in the background, the video VDDD does not actually pass any of the DOS program’s requests to the video board. Instead, the VDDD just makes notes of what the DOS program is trying to do, so that the VDDD can actually implement the desires of the DOS program when the DOS program makes it to the foreground.

In contrast, a video VDDD, when in the foreground, takes the video commands and actually passes them to the video board. A VDDD doesn’t have much to do in the foreground, except perform whatever clipping is required to display the DOS screen. (That’s why DOS programs can do video faster in their own full-screen session than they can when running in a window on the OS/2 desktop.)

Other VDDDs behave the same way, making DOS programs take turns when using the devices that the VDDDs control—except, that is, for serial devices.

A difficult aspect of serial ports is that programmers want to control them directly; they really don’t want any driver or operating software at *all* between their communications applications and the serial ports. They feel that way because communications software has to be able to handle communications fairly quickly—14,400 or 19,200 bits per second (bps) for most modem communications, and 110,000 bps for direct connections—and the CPU has to do the hard work in serial communications.

Serial ports are built around a chip called a Universal Asynchronous Receiver/Transmitter (UART). Most computers’ serial ports have UARTs with the model number

The 8250

WAS BUILT IN THE DAYS WHEN MAKING A CHIP SMART MEANT MAKING IT *EXPENSIVE*. AS A RESULT, ANY 8250-BASED SERIAL PORT HAS NO BUFFER SPACE AT ALL.

8250, a circa-1977 chip. The 8250 was built in the days when making a chip *smart* meant making it *expensive*. As a result, any 8250-based serial port has no buffer space at all. When a byte comes in from the serial port, the 8250 issues an interrupt and the CPU has to drop whatever it’s doing and handle that serial port or the 8250 will drop that data when the next byte comes in.

The 8250 really makes a PC-type serial port about as unfriendly to the idea of a rational multitasking system as could be imagined—it’s a peripheral with no patience.

Some serial ports offer some marginal improvement because they are based on the newer 16450 or the 16550. The 16450 has an extra byte of buffer and it’s composed of faster circuits. The 16550 has a 16-byte buffer and, again, is a little smarter.

(By the way, it perplexes me when people talk about the 16550 as if it were some kind of solution to the problem of building a better serial port. It’s got a somewhat larger buffer, and that’s terrific—16 bytes of buffer means that the 16550 can afford to wait 16 times longer for the CPU to come service it than the 8250—but the whole notion that the CPU has to service the silly thing in the first place is *crazy*. Why not build serial ports with some cheap processor, like an 80186, and about 128K of buffer RAM? The cost would be somewhere around \$80, and you’d have the perfect multitasking serial port. It isn’t done, of course, because of the need for hardware-level compatibility with the original PC hardware. Remember,

virtually every single communications program controls the serial port directly, so an extremely fast but incompatible serial port would be an extremely fast but completely useless serial port.)

The bottom line is that the need for communications programs to squeeze the last iota of speed from the boards means that communications programmers don’t even want their programs to go through a VDDD—they want to go straight to the real thing. You can let a communications program do that with the `com_direct_access` setting. Turn it on, and the DOS program can get right at the ports, without anything intervening.

Apart from speed, virtualizing serial ports presents another problem that is quite different from any problem offered by virtualizing, say, the video board or the keyboard. Every program assumes that the video board and keyboard can be shared. Furthermore, they’re willing to wait to use the screen and keyboard, whether they know it or not. But serial ports... well, that’s another story. You just can’t multitask serial ports. If you’re running one DOS program that uses the serial ports, you can’t run any other DOS programs that use serial ports at the same time.

Only one application at a time, therefore, can be allowed to get to a serial port. On the surface, it sounds easy; all you have to do is give a serial port to the first program that asks for it and deny the others access until the first application is done with it. But, it’s very hard to do for two reasons. You don’t know for

sure when an application wants to use a serial port, and you don't know for sure when an application is done using a serial port.

The **com_hold** setting assists OS/2 in figuring out the latter problem—when to release the serial port. Suppose a DOS program starts up, sniffs around to find out if there are any serial ports available, finds COM2, and starts using it. It stops

using it for a few moments, confident that COM2 isn't going anywhere. Meanwhile, OS/2 sees no activity on COM2 and frees it up for use by another program. The DOS program returns to COM2, or tries to and can't get to it, and crashes. **Com_hold** tells OS/2, "if a DOS program starts using a COM port, assign that port to the DOS program until its session ends."

Com_receive_buffer_flush allows you to tell OS/2 that "when a DOS program acquires a serial port, first flush anything you find that was left over in the port's buffer."

I mentioned earlier that OS/2 has trouble figuring out which program needs the serial port. Because DOS programs don't ask the operating system for permission to use the serial port, no straightforward message requesting the port exists. For that reason, OS/2 can become confused about whether or not a DOS program wants to use the port.

Suppose, for example, you run a program that starts out by taking an inventory of the computer that it's running on, and part of that inventory-taking involves querying the serial ports to see if they exist. Should OS/2 view that as "opening" the port? Maybe yes, maybe no. You can make things easier for OS/2 by simply telling it that "when program X runs, it will need COM2," with the **com_select** setting. Simply choose the serial ports that the program will see and make the others invisible. If the application doesn't need to use any serial ports, you should set **com_select** to None to ensure that any stray twiddling of the serial ports will not confuse OS/2.

The virtual PC controls of OS/2 have been designed to allow you to get the maximum power out of your serial ports—even on DOS programs that are ignorant of OS/2. If you get to know them, you can make your favorite DOS communications programs run great.

Mark Minasi has been a consultant and educator in the fields of advanced PC operating platforms and PC technology since 1984. He is a contributing editor for Compute, BYTE, and OS/2 Magazine. You can contact him at CompuServe 71571,264 or Internet mminasi@access.digex.net.

Reach 60,000 Corporate Buyers



MARKET PLACE

- OS/2, Windows, DOS Software
- High-end Computer Systems
- Powerful Peripherals
- Memory, Board and Upgrade Products
- Storage & Backup Solutions
- Networking Products & Services
- Enterprise Computing
- Multimedia
- Services & Consulting

Advertise in the **OS/2 Magazine**
OS/2 MARKETPLACE

Call today to place an ad!

EAST: Lisa Kraus (212) 626-2448

WEST: Molly Knox (415) 905-8126

Reader Service No. 28

Win-OS/2 Without ATM

TRAP 2 ERRORS, MAXIMIZED PROMPTS, HANG DETECTION, THE LIE LIST AND MORE... BY DAVID REICH



WIN-OS/2 WITHOUT ATM

Q: I work in the printing industry and use desktop publishing packages on a daily basis. Some of the products I use do not require Adobe Type Manager (ATM) fonts and, because I have several-hundred typefaces on an optical drive, the startup time for Win-OS/2 can be quite long. How can I start Win-OS/2 without starting ATM?

A: Unlike Windows, OS/2 comes with the Adobe Type Manager built into both OS/2 and Win-OS/2. When you install the system and choose to have ATM installed, it usually starts automatically. It can, however, be turned off.

To disable ATM in Win-OS/2 sessions, first start the Win-OS/2 Program Manager. You can do this by opening up the Command Prompts folder inside the OS/2 System folder. Select Win-OS/2 Full Screen to start the Win-OS/2 Program Manager. You can also start the Program Manager from an OS/2 command line by typing:

```
START /FS WINOS2 <enter>
```

Once you open the Program Manager, select and open the ATM Control Panel by double clicking and select Off to turn ATM off. You will need to restart Win-OS/2 to make the changes active because ATM is started when the Win-OS/2

I don't always
want to login when I
boot my machine. How
can I suppress the
dialog box?

session is created. Once you have turned it off, you will need to restart the Win-OS/2 session. All subsequent Win-OS/2 sessions will be created with ATM disabled.

You could also create another Win-OS/2 configuration so that you have one session for the applications that require ATM and another for applications that do not. Unfortunately, just starting another Win-OS/2 session will not solve your problem, because both will run off of the same configuration unless you create another Win-OS/2 configuration and set up a program-reference object to point to the other configuration. With this method, you could have one with ATM support and one without.

DETECTING HANGS

Q: I have an OS/2 system connected to a network with the net-

work software installed. Every time I start up my system, I get a dialog box prompting me to login to the network. I don't always want to login when I boot my machine. How can I suppress this dialog box?

A: The dialog box you refer to is displayed because of a parameter in *config.sys* that reads:

```
SET AUTOSTART =
```

The system will start the items specified on this line when the shell is first brought up. Often specified on this line are PROGRAMS, TASKLIST and FOLDERS. The item that causes the dialog to pop up is CONNECTIONS. This entry tells the shell that if the network software is installed, it should attempt to establish network connections on startup, thereby causing the shell to display the login dialog to prompt the user to login for connections.

To disable the dialog, simply edit *config.sys*, find the AUTOSTART line, and remove the CONNECTIONS entry. Make sure you remove the preceding comma when removing CONNECTIONS; otherwise, you may experience a *config.sys* processing error when you restart your system.

TRAP 2

Q: I've read a lot about Trap 2 errors. What are they? Why do they happen?

Introducing...

OS/2 Products from One Resource:



MFG'S REP CO.
Call 800 808-4-OS/2

**Word Processing
Spreadsheets
Graphics** **Utilities
Networking
Development**

Full Service Sales.

We carefully evaluate the software we sell. You get the benefits of our trials!

Mfg's Rep Co. • P.O. Box 7626
Burlingame CA • 94011-7626
Fax (415) 525-2707
Tel (415) 525-2700 or
(800) 808-4-OS/2 [4672]

Reader Service No. 39

America's OS/2 Store

- We stock a complete line of OS/2, Windows and DOS applications
- High-end computer systems
- Supported by IBM and Team OS/2
- Same day shipping
- 8 years of quality service
- All major credit cards accepted

OFFICE SOLUTIONS

404 Termino Avenue
Long Beach, CA 90814
Orders: 310-439-5567
Fax: 310-438-7888
National: 800-897-APPS



Reader Service No. 40

CursorPower™

Want this  or this  for your OS/2 and Windows pointer instead of  or more of these



Knowledgeable users do! Use ours or draw your own.

Regular retail price \$89.95
Special intro price of \$49.95

Includes **CursorPower** for OS/2 and Windows on the same disk.

Winner of IBM's OS/2 Software Developers Award

North Shore Systems, Inc.
(702) 831-1108

Reader Service No. 41

REMOTE-OS Multiuser for OS/2

Reap the benefits of a seamless enterprise with REMOTE-OS' multiuser OS/2 Solution.

Under REMOTE-OS, your existing LANs, DOS, OS/2 or Windows workstations, MACs and various ASCII or 3270 terminals can access the OS/2 local or remote servers to run OS/2 or DOS applications. Since each terminal can multitask up to eight sessions, they can also pass through to Mainframes, Midrange and Minis concurrently.

Cut you integration or small business problems down to size...CALL 407-994-4466 and get your enterprise together!

The Software Lifeline, Inc.
Executive Court One
2295 Corporate Blvd.
Boca Raton FL 33431

Fax 407-994-6304 • Voice 407-994-4466

Reader Service No. 42

Bus & Tag Cables



- unparalleled quality
- unbeatable price
- volume discounts
- fast turnaround time

(410) 298-4411

**Control
Cable inc**

Voice & Data Communications Specialists

Reader Service No. 43

A Perfect Fit Win-OS/2 Support with the Twain for OS/2 DDK



For more information
or
to order your developers kit call:

ST Solution Technology, Inc.
(407) 241-3210 fax (407) 997-6518

Reader Service No. 44

Advertising Index

Reader Service No.	Company	Page
21	Athena Design Inc.	47
22	Binar Graphics	47
13	Bon Ami	19
4	Cheyenne Software Inc.	6
1	Computer Associates	C2
31	Computer Interface Corp.	66
10	Compuware Corp.	16
3	Contemporary Cybernetics	5
43	Control Cable Inc.	64
14	Creative Systems Programming	20
30	Describe Inc.	66
24	Development Technologies Inc.	51
19	FTG Data Systems	44
	IBM Formtalk	10
	IBM PSP	60
	IBM Visualizer	C4
16	Indelible Blue Inc.	26
8	Iomega	14
39	Manufacturers Rep	64
15	MHR Software and Consulting	20
32	Microgate Corp.	71
33	Mitnor Software	71
41	North Shore Systems	64
40	Office Solutions	64
29	On Demand Software Services Inc	65
17	OS+ Resource	35
27	OS/2 Magazine Subscriptions	58
28	OS/2 Marketplace Section	62
11	OS/2 World Conference Proceedings	19
20	PCX	46
18	Sams Publishing	41
5	SofNet	8
25	Softbridge Inc.	54
34-37	SofTouch Systems Inc.	C3
7	Software Development	12
26	Solution Technology	54
44	Solution Technology	64
2	Sundial Systems Corp.	2
42	The Software Lifeline	64
12	Tritus Inc.	19
23	Watcom	48

The information on this page is provided as a service to our readers. The publisher will assume no liability for errors or omissions.

Now that you are running a 32-bit, protected mode, preemptive multi-tasking, segmented virtual memory operating system . . .



Don't you want to see what's under the hood?

Introducing Pegasus Resource Monitor™

for OS/2 version 2.x. The first affordable, professional performance monitor for OS/2 desktops and servers.

Pegasus unlocks the secrets of OS/2 so that you can drive your system harder and faster. Pegasus reaches into the OS/2 kernel to grab accurate statistics on CPU, memory and disk performance. Other OS/2 monitors saturate system resources. Pegasus keeps track of all OS/2 foreground and background activity, including DOS and Windows apps, and does it with low overhead.

Pegasus lets you see inside OS/2 in real time or access comprehensive performance statistics using the Pegasus REXX extensions for analysis after the fact. Exceptions pop-up to alert you automatically when problems are occurring. Or Pegasus can display a concise graphical view of system performance on your desktop at all times.

For a limited time only, Pegasus Resource Monitor for OS/2 is just \$99. Competitive upgrade only \$69.

Introductory price \$99.

Competitive upgrade \$69

ONDEMAND

Software & Services, Inc.

1-800-OS2-OS2-9

(672-6729)

FAX: 813- 261-6549

Pegasus Resource Monitor is a trademark of C.O.L. Systems, Inc. All other company, product and brand names are trademarks or registered trademarks of their respective holders.

A: A Trap 2 error is a non-maskable interrupt error. The most common cause of a Trap 2 is a memory error. If you see a Trap 2 error, it means OS/2 has detected that a piece of memory did not properly store or return what was placed in it. What happens then is really a function of the hardware and what OS/2 can do with it. The solution to this problem is dependent on the hardware. You can, however, take some steps to minimize the incidence of Trap 2 errors.

In general, when a Trap 2 error occurs, the system has detected a memory error, which indicates that the data stored in that memory cannot be relied upon. This one little bit of memory can cause the entire system to behave unpredictably, overwriting memory or disk files, or giving you other erroneous information. Depending on the bit of memory in error, it could cause a problem that you

may not see for several hours or even days.

OS/2 responds to these errors differently depending on the type of hardware you have. More specifically, OS/2 responds to Microchannel-bus machines differently than it does to others because the Microchannel bus is designed to provide more information and error recovery than other bus systems.

When OS/2 sees a memory error (Trap 2) on a Microchannel system, it looks to see whether the memory is in a user (application) page, or a critical system (OS/2) page. In the first case, OS/2 writes the failing memory location to the hardware-writable area (CMOS) and terminates the application, leaving the operating system to continue running. The information about what happened is presented to the user and the failing memory location is displayed. If you have a Microchannel PC, you can obtain a utili-

ty from the IBM PC Co. that will take the address and provide a socket number so that the user will know which memory module is faulty. In addition, the operating system reads the CMOS on the next system startup, so it knows not to map that failing memory location on subsequent boots.

If the failing memory location is mapped to an operating-system page, OS/2 has no choice but to take down the system immediately. Unfortunately, this is the more common occurrence of a Trap 2 error. When it happens, the system displays an error message indicating that a Trap 2 has occurred and immediately halts.

When Trap 2 errors occur on non-Microchannel machines, less information can be obtained. Of course, the failing memory location can be found, but the mapping of that location to a module or even storing it in CMOS is more compli-

DeScribe® WORD PROCESSOR **50H!**

You'll exclaim too, when you discover how fast and productive a **TRUE, NATIVE 32-BIT WORD PROCESSOR IS CAN BE!**

DeScribe 5.0 is a mature, full featured word processor for OS/2, with unsurpassed speed and performance.

"The more I use DeScribe, the more impressed I am. How could I have put up with WP for so long!" -MICHAEL LUNDY- DESCRIBE USER

BUY DESCRIBE TODAY!

\$299 DeScribe 5.0 SE - Subscription Edition includes free upgrades and support through Dec. 31, 1994

\$159 DeScribe 5.0 CX - Standard Edition includes free installation support and access to Pay Support Services.

\$29 DeLights - Continuous CPU Monitoring Utility. (Automatically included DeScribe CX and SE products.)

To order call: DeScribe, Inc.
1-916-646-1111 (West Coast)
1-813-732-5500 (East Coast)

CREDIT CARDS & CHECKS ONLY



• LAN • Site License, Windows™, and Windows NT versions also available.

CONTACT CONNECTION™

**CONTACT MANAGEMENT SOFTWARE
for OS/2**

- + Enter Unlimited Number of Addresses, Phone Numbers & Free-Text Notes for each Contact
- + Easily Generate Address Lists, Mailing Labels, Envelopes & Form Letters
- + Track Actions & Files Related to Contacts
- + Automatically Dial Phone Numbers
- + Assign any Number of User-Defined Codes to a Contact
- + Use Sophisticated Searching Features to Find Contacts Based on any Combination of Criteria
- + Fully Graphical User Interface
- + Extensive On-line Help
- + All for just \$99

Computer Interface Corporation
Call (800) 992-3428
Fax (508) 651-8112
5 Whittier Road, Natick MA 01760

cated (due mostly to the lack of standards in the PC-hardware industry.) As a result, when a Trap 2 occurs on a non-Microchannel system, all OS/2 can really do is tell you what happened and halt the system to prevent any data loss.

PREVENTING TRAP 2 ERRORS

Q: Now that I understand what a Trap 2 error is, how can I avoid them?

A: Trap 2 does not always indicate a piece of bad or defective memory. Often, it occurs because you have memory of different speeds mixed together on the same memory cards. Because OS/2 stresses memory (and all of the hardware, in fact) more than other operating systems, such as DOS, you should understand and use hardware that is very closely compatible. The primary factor in healthy memory Trap 2 errors is speed.

All memory is speed rated in nanoseconds (ns). The general rule is that all memory modules on a card be the same speed. Ideally, all the modules on a card should be from the same manufacturer as well, since subtle differences in chips can affect performance. So, it's okay to have 70ns memory on the system board and 80ns modules on an expansion card, but don't mix 70ns and 80ns modules on a single card. Apart from monitoring your memory's speed and manufacturer, you can't do much to avoid Trap 2 errors, other than avoiding "cheap" memory. I suggest that you purchase quality memory modules.

If you do experience Trap 2 errors, you will need to identify the failing module. Most likely, you will have to do so through trial and error, replacing modules until you find the one that is failing.

Before the days of higher-level operating systems, hardware-manufacturing techniques and quality control

were not as strict as they are today. Today's operating systems are not as tolerant as DOS. Since then, however, memory standards are more demanding and the incidence of such errors has been greatly reduced.

THE LIE LIST

Q: If an OS/2 program or device driver is looking specifically for OS/2 2.0, how can I get it to run on OS/2 2.1?

A: The root directory of the boot drive in OS/2 2.1 contains a hidden file called OS2VER. This file was designed for programs or device drivers that have been written to look for a specific version of OS/2 (as opposed to looking to ensure that it is running on "OS/2 2.0 or higher," for example). They can run on higher versions, but the version check was not written to take higher versions into account. This file is fondly called "the lie list" by OS/2 developers, because any executable or device-driver file name (.exe or .sys) listed in OS2VER is lied to when it asks for the OS/2 version number from the system.

Of course, programs that really need to know the difference between versions 2.0 and 2.1 will not be fooled, but the lie list will help device drivers that are checking for "OS/2 2.0" instead of "2.0 or higher" and

are trying to run on 2.1. This list is set up with several entries from IBM for programs that have been found to look for 2.0, but work well on 2.1.

To use the OS2VER file for items that you need to add yourself, remove the hidden, system, and read-only attributes from the file. The file is located in the root directory of the boot drive. You can remove the necessary attributes with the **attrib** command:

```
ATTRIB -h -s -r OS2VER <enter>
```

Now, using a text editor, edit the file. You can see that the lines look similar to:

```
20=filename.exe
```

For any program or device driver that needs to see version 2.0 specifically, add a line with its name to the end of the file. If, for example, you have a device driver and executable called *mydd.sys* and *myexe.exe* that need to see 2.0, you would add

```
20=MYDD.SYS
20=MYEXE.EXE
```

to the bottom of the file and save it. You do not need to place the hidden, system, and read-only attributes back on the file.

Now, when this executable or device driver queries OS/2 for the version number, 2.0 will be returned.

MAXIMIZED PROMPTS

Q: How can I change the default to have my DOS and OS/2 window sessions open in a maximized state?

A: When OS/2 is installed, all windowed command prompts—both DOS and OS/2—will open with a default size and a system-chosen position. You can change this behavior by opening a DOS or OS/2

windowed command prompt. Hold down <Shift> while clicking on the Maximize button in the upper right corner. From then on, all windowed command prompts will be opened in a maximized state.

If you want to return the behavior to the default, just open a windowed command prompt and, while holding down <Shift>, click on the Restore icon in the upper right corner. Now all command-prompt windows will be opened with the system default size.

TOO MANY DISKS

Q: I have the OS/2 disk package that has an Installation disk, disks one through 15, and the printer-driver disks. When I install OS/2, it asks me for disk 16, but disk 16 doesn't exist. What do I do?

A: This problem usually surfaces on systems that have had the *a:* and *b:* drives switched. Many computers come with a 5 1/4-inch disk drive as *a:* and a 3 1/2-inch disk drive as *b:*. Because OS/2 has to install from *a:*, and most people who buy OS/2 in disk form (as opposed to CD-ROM) buy the 3 1/2-inch version, some extra work needs to be done.

Although a patch exists that will allow you to install from drive *b:*, many people choose to switch the cabling for drives *a:* and *b:*. That, however, is not necessarily all that needs to be done. Because OS/2 reads CMOS settings, switching the cables does not complete the job. If the CMOS still shows a 5 1/4-inch disk as drive *a:*, the OS/2 installation program will expect 5 1/4-inch disks, which require more than 15 disks.

To complete the job prior to installing OS/2, you should start your computer's utility programs to update the CMOS to tell it that the *a:* drive is 3 1/2-inch and the *b:* drive is 5 1/4-inch.

The lie list will help device drivers that are checking for "OS/2 2.0" instead of "2.0 or higher" and are trying to run on 2.1.

SIO DRIVERS

Q: I've heard a lot about SIO drivers. What are they?

A: The SIO drivers were written by Ray Gwinn and are available on various electronic forums, such as CompuServe and the Internet. The package that the drivers come with contains descriptions on fees and licensing.

The SIO drivers are communications drivers that replace IBM's *com.sys* driver for serial communications. The difference between SIO and *com.sys* is in performance and function.

While SIO is usually faster than *com.sys*, it lacks some compatibility features the IBM drivers have (which is what causes the performance difference in most cases). For example, if you use AS/400 terminal-emulation programs, you may not be able to use them with SIO, but you could use them with *com.sys*. No definitive list of what works and what does not really exists.

Because SIO is available electronically, and you only need to license it for continued use, I can see no reason not to try it out if you are experiencing serial-communications problems or want to

see if you can improve your system's performance.

EXCEL 5.0

Q: I recently upgraded to Microsoft Excel 5.0 for Windows, and it refuses to run under Win-OS/2. After double-clicking on the icon, the first error message is: "An error occurred initializing the VBA libraries." When I click on OK, a second error message appears: "The Timer driver is not installed on this system." The process then terminates. I checked the Win-OS/2 *system.ini* file and the timer driver is correctly listed there (and exists in the *winos2\system* directory). Do you have any idea what's going on? The original Excel 4.0, and now Excel 5.0 were loaded while dual-booted under DOS/Windows and was then migrated to OS/2. I'm running OS/2 2.11.

A: You will need to look in the *system.ini* file, which resides in the *\os2\mdos\winos2* directory of your boot drive. The key statement in this situation is:

```
DRIVERS=MMSYSTEM.DLL
```

If this statement is duplicated, it may cause the problems you report. More than likely, however, the problem you describe is due to the fact that this line is missing from the *system.ini* file. If you don't see it there, add it. Close down the Win-OS/2 session and try, once again, to run Excel 5.0. It should work this time.

David Reich, a contributing editor to OS/2 Magazine and author of Designing OS/2 Applications, has been with the OS/2 development team since 1987. Questions can be addressed to David via CompuServe 76711,632 or Internet speedracer@vnet.ibm.com.

Success (Finally!) for OS/2?

A NEW VERSION OF OS/2 MEANS A BRIGHTER FUTURE THAN EVER BEFORE BY WILLIAM F. ZACHMANN



OS/2 was first announced in the Spring of 1987—seven and a half years ago. IBM assumed full responsibility for OS/2 2.0 in September of 1990—over four years ago. It is now Fall 1994; OS/2 continues at an installed base of no more than four or five million copies in active use, which isn't even five percent of the IBM and compatible Intel architecture systems in use worldwide.

At least 10 people use Microsoft Windows to every one who uses OS/2. A few good native 32-bit applications for OS/2 do exist, but their number is dwarfed by that of Windows applications. Small application vendors can barely pay their rent with the sales of their OS/2 products and major vendors, such as WordPerfect, appear to have backed away from OS/2 development entirely.

Paradoxically, despite these setbacks, the outlook for OS/2 now looks brighter than ever. User surveys show growing interest in and acceptance of OS/2. The trade publications and general business press, after years of ignoring OS/2 (at best) or repeatedly proclaiming it dead (at worst), seem recently to have developed, at the very least, a grudging admiration and, in a few conspicuous cases, downright enthusiasm for OS/2. Converts to OS/2 have been popping up in some of the strangest places. In

addition, a number of long-time critics have started saying some very nice things about OS/2.

The tables are starting to turn in OS/2's favor with the new Warp version of OS/2, on one side, and Microsoft's Chicago, on the other. OS/2's underlying superiority to its competitors as a robust upgrade option for DOS and Windows users is finally getting the recognition it deserves. In fact, the face-off between OS/2 and Chicago may have provided an opportunity for OS/2 to finally assert itself.

By "underlying superiority" I do not mean "gee whiz" technological superiority, but a very practical design that employs solid, but not necessarily glitzy, technological capabilities in a pragmatic implementation. OS/2 embodies, in many respects, excellent technology. It does so, however, in ways motivated more by concerns of practical utility than by technology for technology's sake. For example, the implementation of DOS and Windows virtual machines in OS/2 2.1 includes the capability to run multiple and separate Win-OS2 sessions—each in its own separate Virtual Machine (VM). This technology provides a very practical ability to simultaneously support multiple-legacy DOS and Windows applications—not only better than Windows NT did (and does, even with the Daytona upgrade), but better than Windows 3.1 and MS-

DOS. IBM, from the very first version of OS/2 2.0, provided more versatile and robust VM support for 16-bit DOS and Windows applications than anything Microsoft has been able to deliver.

OS/2 2.0 and 2.1 suffered from some superficial limitations that have stood in the way of broader acceptance: an installation process that was not sufficiently "user-friendly" for many less-experienced users, a painfully slow initial build-up of device-driver support for a sufficiently broad range of hardware, a limited collection of mediocre applets, and quirks in the Workplace Shell. The basic implementation, however, is technologically sound, robust, and of considerable practical value to users who were able to get beyond these superficial limitations of OS/2 2.0 and 2.1.

With the release of the streamlined Warp version (the new "personal" edition of OS/2), the superficial limitations have effectively been removed. Improved installation, more and better bundled applets, the ability to run acceptably well with as little as 4MB of memory, an improved WPS interface, and broader-than-ever-before hardware support finally put OS/2 within reach of just about everyone with a system able to run Windows 3.1.

Meanwhile, Microsoft's Chicago, which promises little that OS/2 does not already deliver, recedes further

over the horizon. Any realistic prospect of seeing Windows 4.0 in shrink-wrap, let alone a version that entirely lives up to the grand promises that have been made for it, moves ever deeper into 1995. When Chicago finally ships, it will need to withstand the scrutiny—not only of how well it does (or does not) fulfill its promises, but detailed feature-by-feature and performance comparisons with Personal OS/2 on identically configured systems.

Microsoft faces the dilemma that they can't convince users of the superiority of the features promised for Chicago over Windows 3.1 without, at least indirectly, calling attention to the undeniable fact that they are already delivered by OS/2. That dilemma is further compounded by the fact that Chicago will not be ready to compete with OS/2 as an upgrade to Windows 3.1 for at least another six months—if not more.

To further complicate matters for Microsoft (and thereby improve them for IBM and OS/2), their capitulation to the U.S. Department of Justice (on the matters of so-called “per CPU” royalty contracts and tie-in sales related to DOS and Windows) deprives them of two of their most powerful weapons in the battle to retain Windows 3.1's commanding market-share lead against OS/2. The millions of copies of Windows that were pre-loaded on people's systems, whether they wanted or needed them, were tremendously important in building Windows 3.1's desktop dominance. But per-CPU and tie-in contracts would have been a tremendous help to Microsoft in juggling what will be a very challenging transition from Windows 3.x to 4.0/Chicago. IBM has already made substantial progress in OEM sales for OS/2 pre-loads as an alternative to Windows and will surely make more in the future. The Consent Decree terms are an enormous help to IBM in that effort.

What's worse for Microsoft are the terms of the Consent Decree that give hardware-system OEMs very good reasons not to pay Microsoft royalties for many of the systems they ship. These reasons apply not only to systems that ship with OS/2 (or IBM's PC DOS, Novell's DR-DOS, or UNIX), but “bare bones” systems without any operating system—which is surely justified in cases where users already own legitimate copies of DOS and Windows. As a result, Microsoft is deprived of what would otherwise have been assured revenues. Pressures on Microsoft do not directly help OS/2, but they can indirectly make it easier for OS/2 and OEM pre-loads to compete in the marketplace.

With a new streamlined version of OS/2, continued delays for Chicago, anti-trust legal constraints that not only deny Microsoft its most powerful weapons in the battle for pre-loads but very likely substantial revenue with which to replenish its war chest, a more favorable climate for OS/2 among analysts and the media, an intense new advertising and promotional push for OS/2 by IBM, and growing recognition that OS/2 is a pretty good operating system after all, OS/2's sales should accelerate over the next year or so.

OS/2 may not quite reach 10 million copies in active use by the end of 1994, but it will surely break through that mark no later than the first half of 1995. Increased use of OS/2 will go a long way towards solving OS/2's applications problem. More fully exploitative 32-bit OS/2 applications aren't available for one reason—OS/2 hasn't sold 10 million copies yet. Once OS/2's active installed base gets close to 10 million, the number of native, 32-bit OS/2 applications will start to grow more rapidly. Nobody can profitably sell applications for a platform without a very large number of users. Windows application

sales lagged far behind claimed sales of Windows itself well into 1993—more than three years after the introduction of Windows 3.0 and nearly a year after the introduction of Windows 3.1. When enough people start using OS/2 (we're close to critical mass already and sure to pass through it during the next 10 to 12 months) enough 32-bit native applications will become available.

Users who have stayed with OS/2 through the dark “OS/2 is dead” days of 1991 and 1992 will finally get a bit more fresh air and sunshine. These devotees have already been joined by a large and growing number of newcomers who are discovering for themselves just how remarkably useful, versatile, and robust OS/2 really is—and their numbers will swell even further in the months ahead!

The battle isn't over yet, of course—Microsoft will eventually deliver Chicago. How the OS Wars will go after that depends on how OS/2 and Windows 4.0 stack up against each other. If Chicago comes close to the promises made, OS/2 will continue to have a tough struggle for market share. I think it's more likely that Chicago will be very late and/or will fail to deliver what it has promised, allowing OS/2 to gain the upper hand during the next few years. Regardless of how it sorts out later in 1995 and 1996, OS/2 has a spectacular opportunity to gain ground in the months ahead and will surely do so. It looks like OS/2 will not be denied, for much longer, the broader success that, so far, has eluded it.

Will Zachmann, a well-known computer-industry analyst, is the founder and president of Canopus Research, based in Duxbury, Mass. He is also a former vice-president for corporate research of International Data Corp. You can reach him on CompuServe at 76004,3657, or on his popular CANOPUS forum.

End Notes cont'd from p. 72

The included disk offers over 100 batch-file samples with ready-made icons, but there's a succinct tutorial on the icon editor so you can create and/or edit icons until you drop. The remaining chapters in Part 1 reveal the power of batch files with progressive examples. By the end of Part 2, you'll be writing and exploiting many useful batch files, including disk formatting and automated backups.

An important point for the beginner is that the basic notions of *programming*, good, bad, and ugly, start to emerge. Although the batch file offers puerile control compared with high-level languages such as Ada or C, there is nevertheless an undoubted "clang goes the trolley" (also known as an "algorasm") when you successfully create a sequence of statements that the computer obeys. But, even at this elementary level, you meet the syn-

tactic niggles and arresting humiliations of the bug. Before you know it, a spurious space has been typed, and you are dragged into the deepest dumps of real programming! Chapter 24, by the way, provides sound hints on debugging wayward batch files.

What about the "advanced" user, well-versed in DOS BATtalia? Well, *OS/2 Batch Files to Go* rates highly on two counts. Richardson explains in detail the annoying minor, and therefore major, annoying differences between DOS and OS/2 batch conventions. And, he provides an excellent overview of REstructured eXtended eXecutor (REXX) together with several useful REXX programs that can be incorporated into your batch files. REXX, of course, is the standard IBM System Application Architecture (SAA) command language, and the main reason why IBM did not expend too much effort in

enhancing the DOS batch language for OS/2. If you are tempted to explore REXX in more depth, Ronny Richardson has written *Writing OS/2 REXX Programs* (IBM McGraw-Hill, 1994).

Summing up: if you want to improve your OS/2 productivity, *OS/2 Batch Files to Go* is the way to go!

RESOURCES:

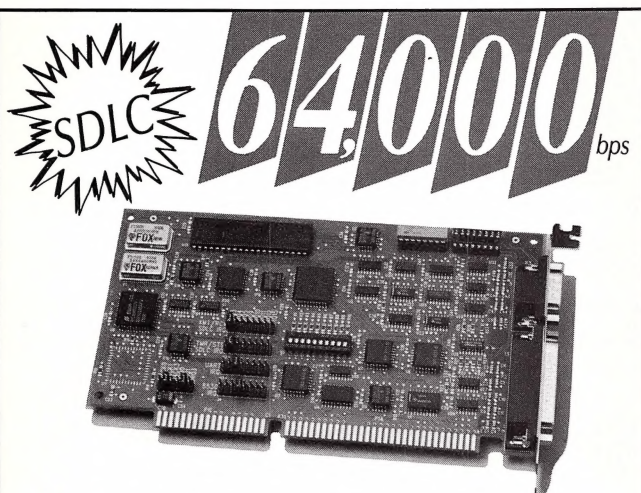
OS/2 Batch Files to Go (\$32.95)

Ronny Richardson, Windcrest/McGraw-Hill
New-York, N.Y., 1994.

348 pages, includes 3 1/2-inch disk

READER SERVICE NO. 214

Stan Kelly-Bootle started computing on EDSAC I at Cambridge over 40 years ago and has written at least 11 books. His Devil's Advocate column in UNIX Review has been running since 1984. He can be reached on CompuServe (70323,1560) or Internet (skb@crl.com).



Digital Services Adapter

Designed for high-speed OS/2® Communications Manager/2 SDLC connectivity using switched or leased digital WAN links, the DSA cables to modems, DSU/CSUs and ISDN Terminal Adapters via V.35 or RS-232. Includes SNA Dialer PM software for "AT" command autodialing. **Features configurable IRQ support with CM/2 1.11.**

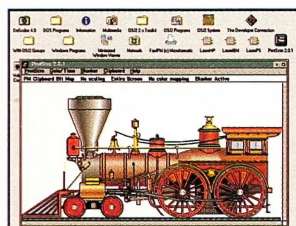
For more information call (800) 444-1982 or (512) 345-7791

MICROGATE®

All trademarks or brand names are the property of their respective owners.

Reader Service No. 32

SINGLE KEY-STROKE SCREEN PRINTING



UNRETOUCHED SCREEN
IMAGE CAPTURED BY PRNTSCRN

SCREEN
SAVER

SCREEN CAPTURE

.WPG .MET .BMP .PCX .TIF .GIF .PCT

- Quality Color or Black & White copies of color Desktop Images.
- Copy any portion of any image on the Desktop.
- Screen Saver prevents monitor burn-in.
- Date & Time Display for Time-Stamping images.
- LAN installable. Complete support for LAN attached printers.
- Economical! 4 Utilities for 1 Price! Entity licensing available.
- The most stable and reliable product available.
- Includes both OS/2 2.1/2.0 (32-bit) and OS/2 1.3 (16-bit) versions.

THE LEADER: **PrntScrn™** Screen Image Utility for OS/2



MITNOR Software
Phone: (918) 357-1628
Fax: (918) 357-2869

Reader Service No. 33
OS/2 MAGAZINE OCTOBER, 1994 71



Beti BAT*

OS/2 BATCH FILES TO GO BY STAN KELLY-BOOTLE

My book reviews in recent issues have covered the expansive, general "bibles" for OS/2 users. As I pointed out, such books aim to be comprehensive but inevitably fail to do justice to some important topics. For the next few months, to balance the picture, I'll be looking at the more specialized OS/2 books that focus on filling these gaps. Naturally, I will need to muster a harsher critical apparatus—the single-topic books typically cost the same as the thicker general ones, and a lemon concentrate can leave an expensively sour taste.

This month, I've chosen a book unashamedly devoted to one particular aspect of OS/2, namely exploiting the power of batch files. This useful but contentious domain is often scrimped in the general texts, so Ronny Richardson's *OS/2 Batch Files to Go* from Windcrest/ McGraw-Hill is especially welcome. For what it's worth, the book bears the official "OS/2 Accredited" stamp of IBM's corporate approval. I hope I'm wrong, but my cynical heart tells me that only OS/2 books written, foreworded, or endorsed by Bill Gates would risk non-accreditation. I see Louis V. Gerstner calling for a Board vote: "Are we all agreed that *OS/2 Batch Files to Go* meets our stringent tests for accuracy, congeniality, and political correctness?...accepted *nemine contradicente*."

The very word "batch" reeks of anachronism. It recalls the heavy-iron days when Job Control

Language (JCL) tab cards were shuffled into the deck to coax a sequence of jobs through the 704, 1401, or name your own favorite, rust-in-peace iron. For even older farts, such as moi, JCL was received with suspicion. The syntax was so dreadful that we preferred the God-given manual method: splicing reels of five-track paper tape. Nowadays, for 50 million PC users, "batch" means a mysterious *autoexec.bat* file that takes over when you boot.

To demystify the batch file, Richardson has provided the definitive tutorial and reference to OS/2 batch programming. Indeed, he may have risked IBM approval by honestly discussing some of the deficiencies in the transition from DOS to OS/2 batch-language implementation. In passing, though, note that Microsoft Windows makes no effort at all to provide batch-file facilities beyond those available when shelling back to DOS. Of course, many Windows applications fill this gap with their own diverse idiosyncratic macro languages. Richardson sweated, and conquered all the hard-knocks of DOS and OS/2 batch quirks and rightly deserves the title "Dr. Batch File." The stated target audience is "intermediate," but I would venture that many "beginner" and "advanced" users would benefit.

Let me first address the novice who, so far, has been happy to click'n'launch other folks' applications. No shame there, of course, as that is the Graphical User Interface

(GUI) and Object-Oriented User Interface (OOUI) gospel. However, be aware that a simple mechanism exists for boosting your productivity, self-esteem and peer status. Almost any sequence of operations that engages you regularly can be reduced to (I almost wrote "encapsulated in") a single command. Further, this command can be dramatized as a double-clickable icon. Even further, you get to design and position this icon on your desktop! Richardson takes you patiently and, a vital dogma in my religion, without condescension, through the basic steps.

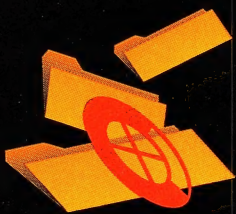
Chapter 1 covers the writing and editing of batch files using the OS/2 Enhanced Editor. Chapter 2 explains how batch files are launched, via the fuddy-duddy command line or the sexy icon. Alas, I see no mention of *startup.cmd*, which is the natural place for batch files that you want to run prior to the desktop. Another minor quibble is that the back-cover blurb refers twice to DBL, an abbreviation not expanded in this book, or indeed in any book in my vast multilingual LIB. Subsequent e-mail with the author (commendably he invites discourse via CompuServe 70322,3100) confirmed my guess at DOS Batch Language.

*BAT is Basque for the number one, the only numeral that goes after the noun in all dialects. Beti bat means "always the same one."

End Notes cont'd on p. 71

SoftTouch delivers OS/2 solutions today.

GammaTech Utilities for OS/2 perform essential file and system maintenance operations for HPFS and FAT file systems.



Some features are:

- Recover HPFS Volumes
- Optimize HPFS, FAT Volumes
- Undelete Erased Files
- Back INI, Desktop Files

Reader Service No. 34

GammaTech Power Pack for OS/2 contains advanced editors for OS/2 files and additional system utilities.

- INI Editor • EA Editor
- Hot Key • Screen Saver



Reader Service No. 35

GAMMATECH™

software for OS/2

GammaTech File Secure for OS/2 provides a high degree of file level security through implementation of the Data Encryption Standard (DES).



- File Encryption • File Decryption
- File Obliteration

Reader Service No. 36

GammaTech REXX SuperSet/2 encompasses seven Dynamic Link Libraries (DLLs) containing over 300 external REXX functions which are registered to the REXX command processor.

Some features are:

- Issue Network Commands
- Manipulate Processes and Semaphores
- Regulate the Macrospace



Reader Service No. 37



SoftTouch Systems, Inc.
Workstation Division

1300 S Meridian, Suite 600, Oklahoma City, OK 73108
(405) 947-8080 • Fax (405) 632-6537

©GammaTech, Inc. 1991-94 All Rights Reserved



Seize the data.



New Visualizer gives you Hands On Information.

You're making decisions. You know the information you need is hiding somewhere in your company.

Wouldn't it be great if you could get your hands on it quickly, easily, and in a form you could actually use?

Introducing Visualizer, our rich new software for making intelligent business decisions.

It's about to change the way you work with

data forever. Now you can grab the information you want, analyze it, summarize it, make it fully understandable, and put it into the hands of the people who need it most – the front-line decision makers. Like you.

Now you don't have to be a database expert to get the data you need. For more information or to order call 1 800 IBM-CALL, ext. 137.

And let Visualizer put it right in your hands.

IBM is a registered trademark of International Business Machines Corporation. ©1994 IBM Corp.